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Bob Cooper's

NOVEMBER 15 2007

SatFACTS

MONTHLY

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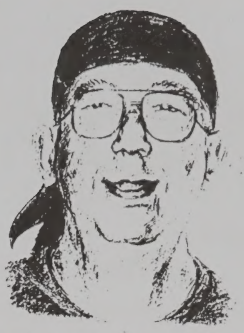

November 15, 2007

The HDMI 'curse'

This issue spends considerable page space detailing a four letter phrase which on the surface may seem to have little if anything to do with satellite delivery. That would be 'HDMI' with its' often-attached companion 'HDCP'.

Virtually every satellite STB ever created until very recently accepted a digital satellite transmission at the input and through various connectors produced an analogue version output. This was a logical approach because for all practical purposes, also until very recently, you could not acquire a TV set that would itself process a digital signal.

But now, almost overnight (well, in a few month's time) a majority of TV receivers on sale have a digital input socket; a 19 pin device known as HDMI (high definition multimedia interface). The primary purpose of HDMI is to allow two digital devices to be linked together - a digital output DVD player (Sony's Blu-Ray) for example, to a TV set also equipped with HDMI. With HDMI, the "digital source" flows through an interconnecting (HDMI compatible) cable without being reduced to analogue. The image on the screen and the sound in the speakers have retained their original digital format exactly as it left the transmitter source, whether that be a local terrestrial DTT transmitter or a satellite service. HDMI, then, seems to be a major step to a "digital = digital" world without the annoyance and degradation that creeps into an intermediate analogue format.

Alas, HDMI is not a precise 'standard' - rather it is a technique, a system as it were and there are many variations of HDMI in use (with more coming into market monthly). Sometimes it is possible to use 'HDMI adapters' to translate version 1.2 to say version 1.3a but the interconnecting cable is only a passive device linking a software program built into say a Sony Blu-Ray with a compatible software program built into the TV receiver. There are plenty of challenges here for anyone attempting to stay up with state-of-the-art as an installer and pity the poor consumer who out of total confusion believes the TV set sales person when told, "*...and it is equipped for high definition TV because it has HDMI.*" Our full report reveals the idiocy of that all-too-common consumer language.

Now, if more and more TV sets are equipped with this HDMI 'technology', why do we still have STBs that have been designed to input digital and output analogue? Here we have people spending extra money for 'HDMI-digital-ready' widescreen television sets which we continue to feed with low grade analogue images.

HDMI means digital first and high definition second. It is possible with HDMI to display SD (standard definition) digital sourced services without any analogue in the pathway. "Possible" is the key word here - you need to think outside the box, accept that HDMI could just as easily be SDMI by eliminating the digital to analogue conversion inside of the STB. What is missing here is some STB designer who is conscious that over the last six months the percentage of TV sets being sold with HDMI sockets (and inbuilt HDMI software) has mushroomed. The time has arrived for STBs to have HDMI sockets (and support software).

Of course there are costs involved here - HDMI equipped television sets typically sell for several hundred dollars more than non-HDMI equipped - although with each passing month it is becoming increasingly rare to even find a non-HDMI receiver on offer. Part of this extra cost involves "licensing" of the relevant HDMI technology by each manufacturer using it but an equal or larger amount is simply manufacturer "greed" as they offer this feature as part of the runaway hype now associated with everything digital. I listened with a mixture of amusement and horror in a local electronics store as a sales person trotted out more and more reasons while the consumer subject was wrestling with an $800 difference between two 36" screens one of which had HDMI while the other did not. Terribly tempted to butt in and set the record straight, I realised that if I did so, the store's management would probably never allow me through the front door again. So I went home and did the next best thing - wrote an 'Op-Ed' piece for the local newspaper attempting to set the record straight for consumers being tempted by wide screens and funny labels; HDMI and HDCP amongst those on offer.

Our focus here should be on identifying why existing satellite set top boxes are not routinely offering HD/SDMI socketry plus software. Eliminating the digital to analogue conversion and the messy options involving S-Video and other so-called 'high definition' analogue transfers present several new design problems but none are beyond engineering to solve. Analogue is yesterday's technology; the TV set makers have that figured out; now it is our turn.

In Volume 14 ◆ Number 159

Freeview's HD versus SD dilemma -p. 7, DRM/Digital Rights Management -p. 8, UHF DTT: Steve Browning Interview -p. 10, MEPS: Too many watts? -p. 12, HDMI 1.3a: start here - p.16, "With HDCP": selling a negative -p.20, Dish Installers -p.27

Departments

Programmer/Programming -p.2; Hardware/Equipment Update -p. 4; SatFACTS Digital Watch -p. 22; Supplemental Data -p. 24; With The Observers -p. 25

-On the cover -- Crazy Peter invades New Caledonia - Australian TV "in the fringes"

LETTERS

Freeview Auckland Views?

(Editor's note: We asked Freeview's Steve Browning whether the various Auckland static video camera views [SF#157, p. 27] previously available on Freeview would be brought back. The cameras gave visual looks at famous or not so famous areas of 'The City' but disappeared late in September when Stratos, TVNZ6 and Parliament launched.)

"The decision is TVNZ's but I think the answer is no." (Steve Browning as steve.browning@freeviewnz.tv)

We asked this because we carried this FTA channel on our cable TV system (supported on audio by a local radio station) and as soon as it ceased we began receiving telephone calls from cable viewers who missed it. If you think it should be returned, contact Mr Browning at the above email address.

Is there a clue here?

"I find Stratos and Parliament which appear as channels within the SKY NZ package are in fact not on *any* of the SKY transponders; apparently SKY has software modified its universe of receivers to allow access to these two channels by moving the receivers to 12.456Hz (Freeview NZ Tr 12). So if they can do that, why can't the same receivers also access Freeview 12.483Hz which has TVNZ6 on it?"

James Benjamin, Auckland

There is a minor behind the scenes power play here. Parliament (also on 12.456 and also available to Sky receivers) is considering a new piece of legislation that will, if adopted, make it possible for SKY to update its receivers to access ALL of the Freeview channels, including TVNZ6 and TVNZ7. At which point one must ponder why Freeview needs to exist at all if a SKY subscription receiver offers the same channels. The answer to that of course is price - if SKY adopted a "free to view" policy for all "free to air" channels the reason for Freeview would disappear. SKY comes close already offering for a one-off price (varies but typically NZ$150) a STB with access to Prime (currently missing from Freeview) as well as the other free-to-view channels.

NOTE: Reminder that January issue will be delayed because of printer holidays to January 25 mailing date.

PROGRAMMER PROGRAMMING PROMOTION UPDATE

NOVEMBER 15, 2007

Help yourself? In our SF#157, Coop's Comment, we suggested duplicate transmission of FTA services on both Freeview and SKY NZ (such as TVOne, 2 and 3) was an unnecessary misuse of valuable transponder spectrum. Further we suggested the hard nosed refusal to work out an agreement between protagonists presents a serious impediment to the creation of a viewer-attractive Freeview service. In SF#158, Freeview's Steve Browning told us, "*Differences will always exist as they do between competitors in every industry.*" Technically, for every SKY NZ subscriber to have access to one or all of the Freeview channels only requires software instruction sent to the SKY STBs. SKY receivers share symbol rate (22.500), FEC (3/4) and other parameters with Freeview. SKY is able to free up for other programming any services which they can transfer viewers to Freeview to watch. Enter the October start of Stratos and Parliament. SKY has advised their viewers where to locate these two services assigning Stratos to channel 89 and Parliament + Maori TV. None of these services are actually transmitted on a SKY transponder but of course the SKY viewers don't need to know that. None, by the way, shows up in the SKY (web site) EPG - there *might be* some copyright issues there. OK - we have a start - three Freeview channels are now available to SKY without any transponder expense to SKY.

A record for show closing? SBE2007, scheduled for October 10-13 in Reno, Nevada, was cancelled *late* on October 8th with an e-mail announcement to those who had pre-registered, and, to the exhibitors. According to one of the show's major sponsor firms, "*Our group was waiting for a transfer flight to Reno in Los Angeles having flown from Atlanta earlier that day. At that point we went on to Reno where we linked up with others who had either not received the message or who were too far into the trip to turn around.*" Considering that the exhibitors had spent big bucks for the booth space, and had shipped booth displays and personnel to the site weeks before, this would appear to be the end for the Memphis show promoter who began in April 2006 attempting to create an "independent show" outside of the pre-existing "big two" annually staged by DirecTV and Echostar's DISH Network. Why did it go so close to the wire before being cancelled? A $17,500 prepayment that somehow did not arrive for the Reno Convention Center rental would be a part of the reason (the Convention Center was advising exhibitors who arrived early to set up their booths, "*When we are paid then you can get in.*")

Freeview approval? For the DTT (UHF) versions scheduled for sale March-April, the FV consortium had six models to be tested (in UK by the way - not NZ) as of mid-October. At this stage, there is no 'exclusivity window' as there was established for STBs used for satellite. Following UK bench and certification testing, units will come to NZ for one by one field testing.

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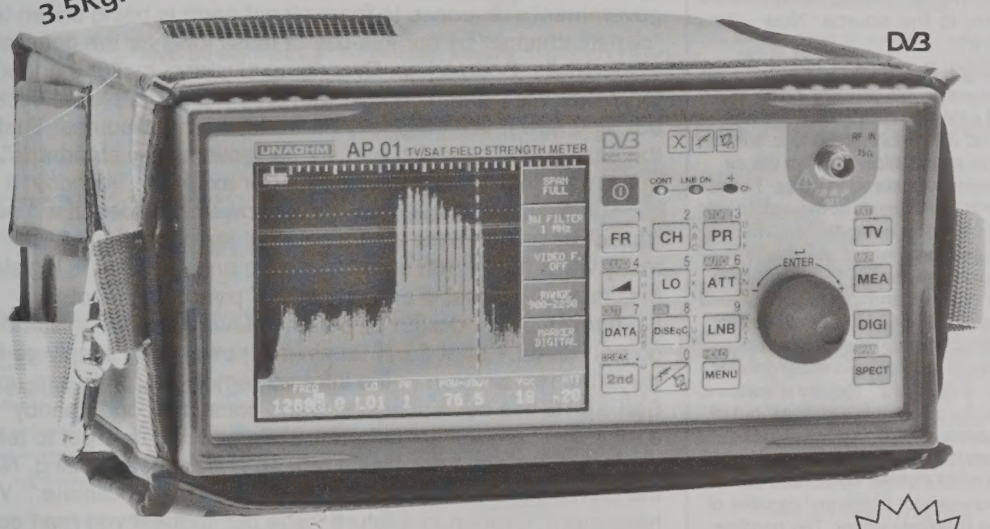

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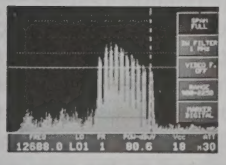

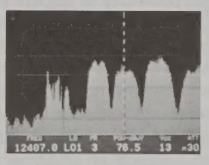

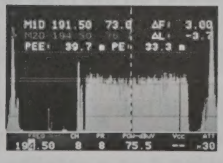

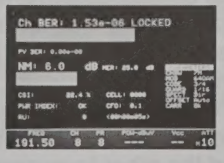

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CDMA interference

"I read your article concerning RF radiation leakage involving CATV systems. I work as an RF engineer for TATA Indicom, a CDMA Mobile Service provider based in Delhi. We are facing a high reverse link noise problem leading to a high percentage of dropped calls; a spectrum analysis revealed a high noise spike in the 825-840 MHz portion which is where we operate. The area's cable operator co-operated by turning off an amplifier located near our remote receive site and the noise spike disappeared. This, then, is the source. Now - how do we fix it?"

Srijith P, TATA Indicom

The signal levels present inside of a coaxial cable TV distribution are high enough that when connected to a 'suitable antenna' would allow through the air transmission measured in miles. These levels are at a maximum at the output side of a trunk or line extender amplifier - directly measured with a suitable meter they could easily reach 120 dBuV on a single TV channel and the sum of several channels (825-840 MHz could easily contain two channels plus portions of two more) would be proportionately greater. However, it does NOT require a 'suitable antenna' for interference to 'leak' out of the system. Hardline coaxial cable (aluminium jacketed sheath) can develop hairline cracks under stress and these 'cuts' become 'slot antennas' capable of radiating (leaking) signal. The hardline connectors, especially at the amplifier output or on any equipment that follows within the first 100 metres or so - if not properly tightened - will allow signal egress as well. Then there is the possibility a customer drop line (typically RG6 or RG11) is damaged or has a loose (not tight) fitting - and the same egress occurs. Finally there is the unlikely but possible misuse of a cable drop which has been purposefully or accidentally connected to an (outdoor) TV antenna - in effect the cable drop signal is being retransmitted through the air by being connected to the nominally-used reception (only) antenna. Fixing the problem involves using a short, insensitive antenna and a spectrum analyser to follow along - probe - the suspected area. The point of leakage (or points) will quickly reveal themselves.

Replacement dish?

"Replacing a 4.5m C with a 3.7m Ku rated; with Fuji SS1-T20 LNBF has been in use in Auckland to gain stable lock in moderate ran from 'forbidden' Oz channels. This LNBF seems to be highly rated."

PB, NZ

Let us know how it works for you - we also have good reports on this device.

HARDWARE EQUIPMENT PARTS UPDATE

NOVEMBER 15, 2007

Watts up? Just when you though federal government intervention in your life had reached a plateau, along comes MEPS which will (trust us) change the way you will do everything using devices that rely on electrical power in the future. "**M**inimum **E**nergy **P**erformance **S**tandards" (MEPS) is government's response to fears planet earth is being driven to "climate change" by our mis-use of fossil fuels for the generation of electricity. Bottom line: Everything electrical by 2010 or shortly thereafter will have to be sold with prominently displayed stickers advising how much electricity (in watts) each consumes. That's the easy part. The tough part will be "government standards" mandating that when a device is in (for example) "*standby*" it cannot use more than "X" watt(s) of power. If it does, it will be "taxed" by government - the amount of tax a function of how many watts it uses (on standby) above and beyond the legislated maximum. The goal is one (**1**!) watt of power on standby. *Ho-hum?* Current design STBs and television sets - on standby - do not REALLY shut down to minimal power; they simply go to sleep but remain alert to the infrared remote saying "*wake-up!*". SatFACTS has been checking watts-consumed on "standby" for a number of presently marketed STBs and we have got to tell you "one watt" is a *wet dream* with an anticlimactic ending. Note the clever use of "anticlimactic" as in "against-the-climate." We'll have more to report in a future issue but suggest you read our packaged analysis on page 12 this issue as a starter.

The analogue conversion. With total analogue shut-down of all major television stations (1700+) in USA February 2009, it remains unexplained why virtually all major branded home electronic outlets continue to offer analogue-only TV receivers there. One chain - Best Buy - in both USA and Canada during October became the first to announce they have stopped selling the units while various state and federal government agencies wrestle with how far they should go in mandating in-store warnings. The FCC wants to force analogue TV stations to begin "crawling" messages across bottom of programming; a move resisted by the TV stations. A recent large sample survey found barely 25% of Americans even know about digital, much less the shut-down of analogue. (Editor's note: Strangely, roughly the same percentage cannot locate New Zealand on the map and another 25% believe NZ is located "someplace near New Mexico". Apparently "world's richest nation" does not also equate to "world's smartest".)

World Radio Conference, now meeting, is being pressured by two groups - one wanting 3.4-3.7 GHz redeclared as a terrestrial service band and the other favouring leaving it as a satellite band. Australia, New Zealand are already treating it as terrestrial (for Wi-MAX) while majority of world countries are opposed to incursions into the frequency range by non-satellite services. Meanwhile, **in Fiji**, Sky Pacific has brought suit against Unwired Fiji claiming 3.4-3.7 GHz there is creating havoc.

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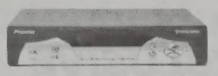

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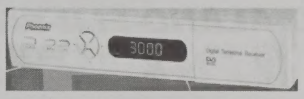

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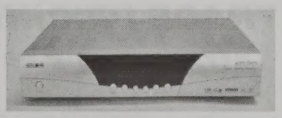

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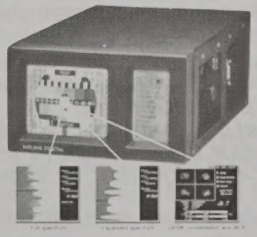

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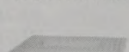

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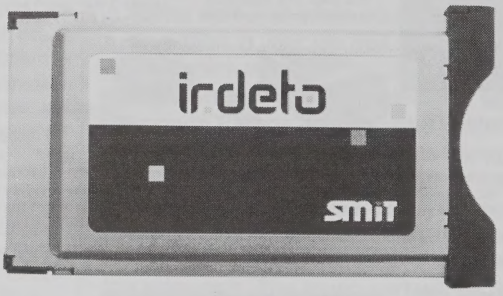

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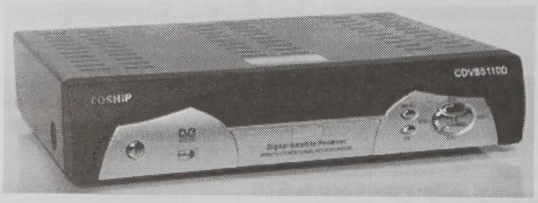

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The Market for Freeview Satellite is Suddenly Much Larger!

Seventy-five percent of New Zealand's 4 million *population* will, according to Kordia forecasts, be within reach of one or more terrestrial based DTT (digital terrestrial) transmission sites. For most homes, this will involve purchasing a digital set-top box (STB) and perhaps adding an outdoor UHF antenna. Later, assuming the home so wishes, adding a suitable digital TV set equipped with the correct fittings and software to allow the terrestrial UHF signals to be looped through the box and then into the (new) receiver. Television New Zealand plans high definition (HD) coverage of the 2008 Beijing Olympics (August 2008) along with a gradual ramp-up of more traditional programming to the HD mode. In New Zealand, HD means 720 progressive scanning. Canwest (TV3) plans their own ramp-up of HD programming as well; PRIME TV (owned by Sky NZ) says they will wait until 10% of homes in the UHF terrestrial coverage region have acquired suitable HD equipment before launching HD programming.

Take a close look at the map to the right - not high definition certainly but you can pretty much work out the 'dark' areas from those that are not dark. Perhaps 75% of the country's population *does live* in a dark area but it quickly becomes obvious perhaps 75% of the *land mass* is outside of a dark area. For these people (1,000,000) there will be no HD television for they will sooner or later be forced to convert from their present analogue over the air (OTA) reception to Freeview's satellite service. And it is not, will not for the foreseeable future, be HD.

Repeating that message: UHF DTT will offer high definition reception; satellite DTS will not. End of story?

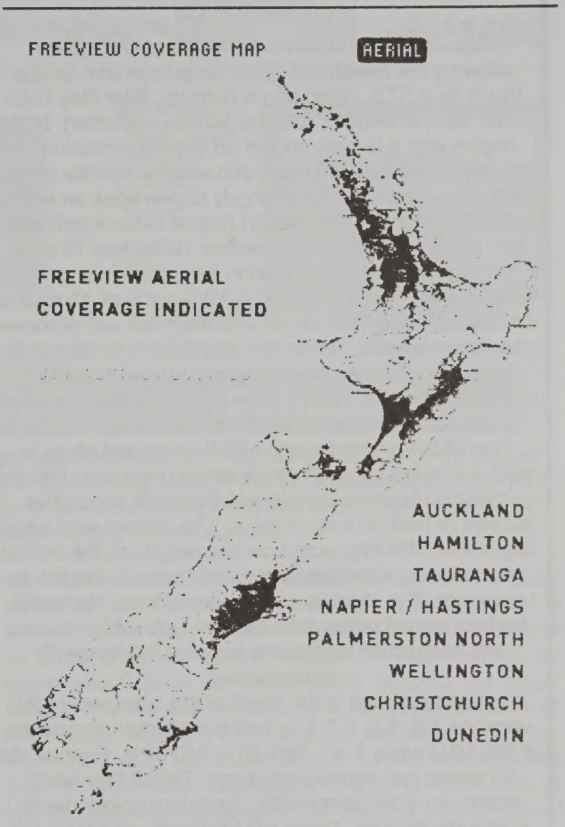
Not quite as we will investigate in this in-depth report.

HDMI?

High Definition television requires a number of steps. The most obvious is that the original transmitted material be in the HD format. There are several of these - 720p (720 lines, progressively scanned), 720i (720 lines, interlace scanned), 1080p (1080 lines, progressively scanned) and 1080i (1080 line, interlace scanned). Progressive or interlace? Computer screens are progressively scanned - starting frame for frame at the top line (#1) and scrolling one line at a time down the screen to the bottom (576 for standard definition/SD; 720 lines for the HD format adopted by Freeview, 1080 lines for the more advanced computer displays and adopted for HD TV in Australia and the USA). The TV set you are currently using is interlaced scanned breaking each frame into two fields: line 1 is followed by line 3 followed by line 5 through the bottom and then the frame is completed with the second field restarting at line 2, then 4, then 6 and so on to the bottom. Interlace scanning is a holdover - artefact - from the British and American developed TV of the 1930s. Interlace scanning attempts to fool the eye and eliminate picture "flicker" by doing every other line in a field and then laying the second field within the first; 25 times each second (30 times in the American NTSC system).

Progressive scanning was an option in 1936 when interlace was adopted but at the time the British system was 405 lines total and the American was 343 lines. Neither was 'large' enough to eliminate flicker and as a result interlace was adopted - it is all a function of how long your brain retains an image and how rapidly the screen can be 'refreshed' with a new image. Progressive scanning with 720 or 1080 lines solves that problem and you have to but connect to a video link on your web supported PC to verify that statement. Therefore one would think 720i or 1080i would be a relic from the past. Think again.

Once the HD signal is transmitted (in digital format in our case) it becomes the task of the receiver(s) to decipher the data stream and paint images on the screen. If you are reading this in the UK (or America) you can walk into any electronics department in any store and find a choice of complete television receivers which accept the DTT signal from a suitable (UHF) antenna and promptly display digital 16:9 images. There is no STB (set-top box) required - the guts of the STB are built into the digital TV set. If you search far



If an area/region is "white" (not dark), Freeview reception will be limited to standard definition (576 line) satellite. For a more detailed coverage map, see http://freeviewnz.tv/index.php?section_id=8.

Digital Rights Management = HDMI

HDMI™
HIGH-DEFINITION MULTIMEDIA INTERFACE

High-Definition Multimedia Interface is a system allowing the transfer of digital data from one device (such as a STB, video game console, Blue-Ray DVD player etc.) to another (display screen, recorder). HDMI begins with a female socket (at the 'transmission' or origination device) and ends with another female socket (at the receptor device). It largely supersedes an earlier similar system known as DVI (digital video interface). The DVI was a 24 pin connection; HDMI has 19 pins.

HDMI cable is attenuation sensitive limiting lengths to 5 metres (using #28 AWG wire) or 15 metres (#24 AWG wire). Yet larger wire diameter will increase maximum lengths further but dual CAT-5 or fibre optic are typically used for very long runs (such as 100 metres). In-line amplifiers, repeaters and equalisers are available for even longer runs.

One of the problems with HDMI cable and plugs is mechanical integrity. The male end(s) plug slips into the chassis mounted female and there are no captive screws or latch to keep it there. This makes wire sizes larger than #24 impractical as the weight on the socket becomes considerable and gravity causes the two to separate. The chassis end connectors are (typically) surface mount rather than through hole which makes the connection vulnerable to being inadvertently disconnected.

A second problem is the "age" of the interface. HDMI versions 1.0, 1.1, 1.2/1.2a had a maximum bandwidth of 165 MHz while 1.3/1.3a/1.3b is 340 MHz. Further, the 1.3 series has significantly larger TMDS bandwidth, maximum video bandwidth, maximum colour depth, automatic lip-sync, Dolby HD bitstream, and DTS-HD audio bitstream capable. Alas, this is the cable only - both the origination end (such as a STB) and the reception end (the receiver/monitor) must also be capable of software processing these latest additions.

A third problem, which also relates to what is being transmitted and processed, deals with closed captioning. Line 21 nominally is used for closed captioning. Alas, line 21 is not included in most MPEG STB processors so the closed caption data is not available to be linked to the receiver. Assuming the DTT (or DTS) STB does in fact process line 21 (to the HDMI connection), there remains the challenge of whether the TV receiver is Line 21 compatible - it must be to create the captions on the screen - through the HDMI connections (and cable). There are 'custom' solutions to this challenge but they would have to be adopted by the entire system starting with the transmission end and culminating in the HD-HDMI compatible television receiver. For Freeview comments on this question, see page 16 here.

HDMI, then, is a 'system' but not a 'standard' as there are variants which must be adopted not only by the origination source but the STB and TV receivers.

enough, you can also find the same functions in a complete television receiver in Australia. Alas, not yet in New Zealand (2008 about mid-year is the forecast). The alternative to receiving Freeview NZ (or UK) from a UHF aerial is to purchase and connect a digital-reception STB in between the aerial and the TV set. The STB is a transition device - not unlike the Foxtel/Austar satellite STBs in Australia or the SKY NZ STB in New Zealand.

What goes in is digital TV (at an RF or radio frequency); what comes out is analogue TV, connected to the existing analogue TV set through one of several connection techniques. The Foxtel/Austar/Sky 'box' allows a home with an 'old fashioned' (analogue) TV set to view pictures and hear sound. It is NOT high definition but it looks reasonably good (/1) because it is digital as far as the STB. No existing Foxtel/Austar/SKY NZ STB is capable of delivering a HD image, no matter what TV set it connects to. Period.

To create HD reception on a suitable HD design TV receiver requires three things (beyond the transmission being HD):

1/ A high definition capable STB (or alternately as is available in other countries, a full DTT HD TV set), and,

2/ A high definition television set, and,

3/ A cable connection between the HD STB and the HD television set. This is called the HDMI (high-definition multimedia interface) connection.

HDMI is a standard - well, a sort of standard but as with virtually every aspect of telecommunications these days, it is a moving target, always adapting to new innovations and yesterday's HDMI is not necessarily today's HDMI. We explore this separately here to the left.

HDMI in its' most simplistic form is a piece of special cable with a unique-to-HDMI male connector on both ends. The original purpose of HDMI, which has perhaps been somewhat lost or downgraded as new developments have come and are coming on line, was 'security'. The people who own the rights to programming (think of copyright), when faced with the 'digital revolution', quickly worked out that when a program or movie or event is reduced to digital 0s and 1s, it can be transmitted, shared, sent on to millions of users without the 'permission' of the (copy)rights owner. Digital Rights Management (DRM) was the answer - they thought. If you could plug into a STB and attach to 0s and 1s carrying programming, it was a simplistic chore to send the data stream into your PC and then onto who knows who, where, through the web. So DRM was created - encoding of the 0s and 1s even at the output of say a STB.

So in that short link of perhaps a metre or less, the 0s and 1s have been re-encoded for transmission to, in most cases, a waiting TV receiver also equipped with DRM/HDMI. Inside of the target device, the TV set, the encryption is removed and there on the screen is the image.

HDMI is therefore nothing more (nor less) than a short-link encrypted transmission medium; an 'encoder' on the sending end, a 'decoder' on the reception end. That was the basis for DRM = HDMI originally. But life in the electronics fast lane seldom stays static for long. We'll return to this subset.

As we point out (to the left), HDMI is many different things to different designers and users. There is no one, single, HDMI

/1 - "*...looks reasonably good.*" In fact, digital (satellite and terrestrial) in SD "*looks ... good*" because of a superior signal to noise ratio, not because of any improvement in image definition.

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Caveat emptor - '*consumer* beware'. This (NZ) major chain store web-site advertisement features 10 TV sets of which five (four shown here) proudly have on screen artwork proclaiming 'HDMI'. The 32" Panasonic boasts "Twin HDMI ports" which is an intriguing extra value feature if you are located where even one is too many. The LG 37" is "HDCP capable." (*12*) Confused? Pity the poor consumer!

'interconnection cable' that will do whatever you wish with the transmission technique. Read this carefully: *HDMI does not mean a standard*, it means a technique.

Now put yourself in the seat of a designer of television receivers. HDMI is the new 'buzz word' (well, phrase since it is hardly a pronounceable word!) As we explore in our feature interview here with Freeview's Steve Browning, if you are a retailer of television sets these days you prominently display the four letters (HDMI) on each and every TV set which you have in stock equipped with a HDMI female socket.

HDMI in consumer electronics translates to 'High Definition' (ready/compatible/equipped - take your choice, there is no standard here!). This allows the salesman to stand in front of the customer and say (often out of total ignorance of any fact) "*This television set is ready for high definition reception when it becomes available here*" (wherever 'here' might turn out to be). As often as not, this statement is totally without fact; any fact. For example, suppose the consumer being pushed to a HDMI receiver lives where New Zealand's UHF DTT (with 720p) HD will never - not ever - be available. The sale person's logic is quite convincing - the consumer is ready to purchase a 42" Plasma screen and one model has HDMI and another does not. "*You won't be buying another new television for many years - spend the extra money for HDMI compatible because that will guarantee you access to the high definition television when it arrives.*"

Alas, the home is in a 'white area' (see map, page 7) and there will never - not ever - be UHF DTT available anyhow. And the complications - the "what ifs?" are just beginning.

HDMI? There is version 1.0, 1.1, 1.2 and so on through 1.3b (today - tomorrow who knows what additions will appear). And cables to suit each of the many variations. And - heaven help us - 'cable adapters' to magically adapt a 1.1 to a 1.3. or anything in between. So *which* HDMI wiring version is inside of that 42" plasma screen the consumer is being pushed to purchase? And is that version compatible, even adaptable with an adapter, to the HDMI sockets on each end of the connection? This is not merely about selecting the proper cable; it is about what functions have been 'HDMI-authorised' at the sender end and which compatible functions are built into the receptor end. There are dozens of variants here stretching from the transmission origin point (Is - for example - line 21 closed captioning functional???) to the final HDMI enabled software in the receiver. The sales person has to be a pretty smart cookie to work through these variants, and be certain the 42" plasma screen the customer lugs out of the store is in fact the correct HDMI version for (1) where they live, (2) how they intend to use it, (3) what special features (such as closed captions) they expect to function. A 42" Plasma screen with HDMI means almost nothing if it does not do what the customer expects it to do.

12 "*HDCP capable.*" The seller of this product is promoting a negative. HDCP in shorthand is "high definition content protection". It means "digital content protection" which automatically restricts video content to SD 576 line DVD quality and audio content to DAT quality - neither of which is 'good' and both of which require 'permission' to utilise. As one reviewer notes, "*this is like restricting you to driving with handcuffs on...*". Unfortunately the advertisement copywriter actually thought 'HDCP' was a sales feature when in fact it is just the opposite because it restricts users from making copies in HD or at all. But you can picture the sales person, loaded down with memorised sales pitches, proudly telling the buyer "*and it has HDCP!*".

The second interview:

SatFACTS asks Freeview's Steve Browning the tough questions involving launching terrestrial

SatFACTS (SF): You advised us in the October interview that nine population centres will be equipped with digital terrestrial transmitters and these are forecast to reach 75% of our country's population. On the assumption the terrestrial service is turned on for all 9 centres by March-April as planned, at what point do you see the existing analogue transmitters being shut down?

Steve Browning (SJB): The Government are setting the timetable for analogue switch-off (ASO). That plan (subject to Cabinet approval and based on a public consultation process earlier this year) says that they will set a date at 75% of digital penetration (measured to the main TV sets in private dwellings) or 2012 whichever is reached first. We are currently at approximately 45% (Freeview + Sky Digital households).

SF: Sweden in October turned off their last analogue transmission channel, nation-wide, having begun the digital switchover in 2005. Also in October, the UK selected the community of Whitehaven to be their first analogue switch-off (ASO) region. By 2012 the last geographic region in the UK is scheduled to lose analogue service. Is it too early to forecast whether New Zealand's shut down of analogue will be done all at one time as in Sweden or by geographic regions as in the UK?

SJB: The Government have decided to leave this decision to a body they have tentatively named 'Digital NZ'. This body will be made up of representatives of Government and impacted industries and will be established after Freeview terrestrial (DTT) has been established (i.e. we have achieved a full digital switch-on).

SF: In the United States, more than 1,700 VHF and UHF analogue transmitters will be shut down all at one time coast to coast; February 2009. Neighbour Canada is scheduled for August 2011. Most of the US analogue channels have had parallel operating digital channels for several years and in theory as consumers purchase new or replacement TV sets, these have been digital capable. Unfortunately, recent surveys reveal under 25% of American consumers are even aware of this changeover, now only slightly more than a year away. What planning is being done to reach Kiwis with the digital change over information?

SJB: "That will be 'Digital NZ's' primary role. Freeview is already educating Kiwi's about digital television - see www.freeview.tv, as well as many press interviews like this one. We are doing this to encourage people to adopt digital television because it offers a better TV experience - more programme choices (than analogue), better picture and sound quality plus features like the electronic programme guide (EPG)."

SF: Major USA electronic retail chains continue to offer analogue only TV sets and little or no effort has been made to warn consumers that these sets will be quite useless after February 2009 - unless the user acquires a digital set top box. Would Freeview be in favour of legislation that mandates all sellers of analogue only TV sets properly label these new sets with a digital warning so that consumers will not be mislead during this transition period?

SJB: Freeview are approaching this issue the other way around by offering certification of all digital receivers (both set-top boxes and integrated digital TVs). This provides the manufacturer with a brand license which enables them to label their products as Freeview approved. This gives people confidence that the product is compatible with the Freeview signals and will therefore work after ASO.

Transition from analogue to digital: The world
(A quick sampling of other countries)

Australia: An analogue turn-off day remains subject to political indecision. An estimated 28% of homes now have free to air digital reception equipment but that number is seriously questioned by equipment sellers. HD is now functional.

Canada: Pushed by its neighbour to the south (USA), which will switch off analogue in February 2009, analogue here will continue until August 2011 when all stations will switch off simultaneously. Terrestrial digital is both HD and SD; individual station choice.

Great Britain: Complete analogue shut down in 2012; first geographic areas now underway. HD is undecided - it is SD only on Freeview terrestrial at this time. HD, if approved (likely) will wait until after analogue is switched off to allow much needed bandwidth to become available in support of HD TV. When HD arrives, existing SD STBs will require replacement as will non-HD TV capable TV receivers; a situation that does not seem to bother the Brits.

Sweden: The transition to digital is now complete having switched off the last analogue transmitters (SVE2) in October. That Nokia is headquartered here has been a major influence on the early switch over.

USA: More than 1700 existing commercial full-power stations will simultaneously switch off in February 2009; low-power (community) stations will continue analogue to an uncertain date beyond that point. The 1700+ stations have been running parallel (mostly UHF) digital (DTT) for several years but public response has been mostly a giant yawn. However, 85% of all US homes have either cable or (Ku-band) satellite which means they already have digital access in some form and are no longer dependent upon OTA analogue (or digital). DTT stations are allowed to make individual choices for HD or SD but HD use has been rare although cable and satellite now offer up to 50 channels of (1080i format) HD to viewers. Analogue receivers continue to be sold; there has been no government interdiction regarding either equipment sale or consumer warnings, to date.

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And there is the power consumption issue

All electronic gadgets function by consuming electricity. Set-top boxes are no different. But lurking in the background, far below the daily headlines, has been a growing concern that our planet-wide consumption of watts is a leading cause of greenhouse gases and planet climate change. In response, many countries (Australia is one example) are mandating that standard incandescent bulbs will be discouraged or even outlawed; reduce power consumption, lower demands on electric generators, save the planet.

STB use (satellite and cable) combined with TV receiver use have moved to the forefront of a new crusade designed to reduce energy consumption. Some projections, not necessarily believable nor accurate, predict that by 2020 as much as 20% of all electricity consumption in homes with satellite or cable will be traceable to their operation.

Enter MEPS; "Minimum Energy Performance Standards". And the challenge. Australian activists are pressing for a "*1-watt standby maximum*" which means that any device with a "standby option" (that includes TV sets, STBs for two) would when switched to "standby" consume not more than one-watt of power. The target date for this to become effective is 2012 (in Australia with New Zealand close behind in a 'me-too' stance).

"Standby" is a state of rest, but each designer of products sees it from an individual perspective. SKY NZ decoders, one example, don't actually "standby" at all; pushing the button leaves the STB functional to allow downloads and access via satellite control in Auckland. Typically, "Standby" in a SKY NZ (and Foxtel or Austar) STB still consumes 8+ watts of power while the "operational" selection consumes 20+ watts.

MEPS has become a new marketing ploy for manufacturers - each claiming to use less energy than the competition. LG Electronics (Australia) has agreed to a $3.1 million (dollar) rebate scheme after five LG air conditioner models (15,000 units) were found to be using more electricity (watts) than their prominent labelling claimed. OOPS. Electrolux (Australia) closed an Adelaide plant employing 500 people in 2007 following the new MEPS mandates.

Australian homes have 18 million TV sets (2.4 per household). CRT (cathode ray tube) televisions are in most but the latest 30-60" Plasma screens are a new, major, consumption of watts. On average, the new TVs consume two-three as much electricity (as measured in watts) than the screens they replace.

And the STBs. This is the start of a two-five-ten year effort to cause "standby" to mean something quite different from what it means in the technical sense today. Is it actually possible that a STB consuming 10, 20, even 30 watts of electricity in 2020 will amount to 20% (as many forecast) of all electricity consumed in Australia or New Zealand?

The MEPS program is all about reducing energy use and by that action reducing "Greenhouse Emissions" which many fear will create climate change. It is an environmental and political issue and whether you believe it or not, there are strong activists operating "below the radar" who will create new legislation that regulates the way in which we design and use televisions and STBs. Welcome to the "new" world.

SF: We now know that only homes with UHF aerial reception from Freeview terrestrial will be able to upgrade their viewing to HD (high definition); those one million Kiwis living where Freeview will only be available via satellite will have SD (standard definition). This adds a new ingredient to the education process - analogue versus digital and then SD versus HD. Are we not heading for a 'have' and 'have not' social order with this situation?

SJB: High definition broadcasting is in its infancy worldwide. Many developed countries have no free-to-air HD channels yet. New Zealand is able to leapfrog some of these as we are somewhat later to DTT. The broadcasters have been able to jump straight to the more bandwidth efficient MPEG-4 encoding and have enough (allocated) spectrum to make HD on DTT viable. This is not the case with satellite. Bandwidth is expensive and limited on Optus D1 (most of it leased by Sky) and this limits the potential in the medium term for FTA by satellite. This will not necessarily stay this way. DTT coverage could be increased, and/or satellite capacity reconfigured.

SF: The Freeview web site clearly spells out which geographic areas forecast to have terrestrial Freeview service. How cast in concrete are the nine areas so designated? Is there any 'Plan B' lurking below the surface that would, by saw the year analogue is turned off, result in increasing the terrestrial coverage?

SJB: The current rollout is all that the broadcasters are (presently) committed to. This is very good by international standards as many countries have started at 50% or less. The UHF spectrum (multiplex) licenses issued by MED allow for coverage to 87% of the population.

Editor's note: There is a numbers challenge here as all prior information relates that UHF DTT will reach 75% of the population. The 12% difference possibly suggests that beyond the initial 18 transmitter sites - page 18 here - additional UHF channels have been MED-reserved for future expansion of DTT. Note that 1% of population equates to 40,000 people. **(1)**

1/ In fact, MED *has* allocated or reserved additional UHF channels for the possible (note '*possible*' - not necessarily guaranteed) expansion of UHF DTT. What the following table means is that people who 'might' one day have DTT will first be told there option is **SD** satellite although a 'future' Government *might* allow them to have UHF DTT as well.

Whangarei	Horokaka	31	45	50
	Parahaki	33	47	48
Rotorua	Pukepoto	49	55	57
Whakatane	Putauaki			
Bay of Plenty	Paeroa Range			
Taupo	Tuhingamata	28	47	49
Gisborne	Whakapunake?	48	50	59
Taranaki	Mt Taranaki	48	50	59
Wanganui	Mt Jowett	45	53	57
Wairarapa	Otahoua			
Nelson	Grampians?	28	47	49
Southland	Hedgehope	43	45	53

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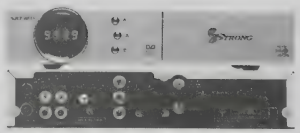
	SRT 4651X	 SRT 4653X	SRT 4654X	SRT 4658X
Blind Scan A powerful and convenient function that searches for those new frequencies and channels that are not in the factory default list stored in the unit's memory	X	X	X	X
USB 2.0 Connectivity For software upgrades and for playing/viewing MP3 and JPEG files stored on memory sticks (flash drives)	X	X	X	X
Component Video Outputs Offering a superior video quality on television sets equipped with such video input connections	X	X	X	X
CONAX CAS7 Embedded Conditional Access System card reader	**Upgradeable**	X	X	X
Common Interface Single slot interface for PCMCIA Conditional Access Modules irdeto MEDIAGUARD viaccess conax				X
DC 12/24V Power Supply For outdoors and/or mobile use with DC power sources			X	

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HDMI 1.3a - What it means

This version of HDMI supports any TV or video format including HD and as many as 8 channels of uncompressed audio (at 192 kHz sample rate with 24 bits per sample). Versions of HDMI prior to 1.3 (and thus 1.3a) did not support compressed streams (Dolby TrueHD, DTS-HD Master Audio) but everything from 1.3 onward does these functions. There is a degree of backward compatibility with single-link DVI (Digital Visual Interface) carrying digital video (DVI-D, DVI-I but not DVI-A) but to do this requires special adapter or cable parts. This means a source such as DVD-D can connect to a HDMI monitor, recent computers or graphic cards can also connect to a HDMI monitor.

HDMI 1.3a typically (but not always) includes HDCP - the content protection system which allows the program source point to determine whether the material can be displayed or recorded and if recorded whether it can only be recorded in SD - not HD. HDCP support goes hand in hand with HDMI in most American (ATSC) television sets but is not as frequently found in the PC industry. LCD monitors, in particular, 17" or smaller in display size, routinely do not include HDCP.

Version 1.3a allows video pixel rates to 340 MHz (using a type 'A' connector; 680 MHz using a type 'B') plus (up to) 8 audio streams. A Consumer Electronics Control (CEC) is optional for the origin (source) or terminator (receptor) but the cable connections are mandatory, allowing: remote control functions (one remote, multiple devices) - in 1.3a, timer and audio command functions were added).

HDCP compliance (versions 1.3a and higher) is a part of the HDMI compliance; it is not possible to have HDCP without HDMI interfacing compliance. HDMI cables are rated largely by 'throughput capability' which is another term for 'bandwidth' (version 1.3 and higher has a throughput of at least 10.2 Gbit/second) but there are physical (length) constraints which also determine throughput.

Version 1.3 (adopted June 2006) was the first to increase single-link bandwidth to 10.2 Gbit/s, also adding optional (not mandatory) 30, 36 and 48-bit xvYCC (aka 'deep colour' - more than one billion colours possible), and adding automatic lip syncing capability (again, optional function not always provided), and added optionally used audio links for decoding by external AV receivers. Version 1.3a (adopted November 2006) modified the basic-3 by adding a 'source termination recommendation', corrected video undershoot and rise/fall time limits, increased the functions for CEC - remote control by one remote, corrected a problem with RGB ranging, and added a tighter program for compliance testing of this and future HDMI formats and changes.

Editor's note: If - IF - you are not now terribly confused, give yourself a pat on the back. HDMI and HDCP and several other acronyms you will be forced to adapt to and adopt shortly are upon us. We al knew the transition to digital was going to be an adventure!

SF: Education of the consumers seems to be a common thread throughout the world where analogue turn off is looming. Large chain stores such as Harvey Norman and Betta appear to be offering the same product models nation-wide without respect to whether consumers in a geographic region such as Whangarei will ever be able to properly utilise HD ready HDMI equipped television sets. The latest BETTA (web site) brochure lists six different HDMI equipped receivers without any warning that the HD features will at best be restricted to those with HD version DVD players, an appropriate HDMI cable, and HD discs such as Blu-Ray from Sony. Who ultimately must take responsibility for encouraging the purchase of these HD equipped receivers when locales such as Whangarei are unlikely to ever have terrestrial HD TV available?

SJB: "Like many new technologies, HD will be available to some but not all at the start (i.e. broadband, mobile telephone being two similar examples). It is wrong to assume that this will always be the case. And as you point out there are other mediums by which HD content will be delivered. I think people in these locations would be disappointed if their local retailer was not offering them the latest display technology."

SF: You (Freeview() are in the process of evaluating terrestrial set top boxes for (Freeview) approval. First, may we assume the approved boxes will have a HDMI compatible socket for a direct connection to a suitable HDMI equipped set?

SJB: "Yes - that is a mandatory requirement."

SF: HDMI seems to be a bit of an enigma at this stage - the original HDMI purpose was to allow interconnection of Digital Rights Management (DRM) encrypted digital streams between devices such as a set top box to a digital television set. At this stage there are several versions of HDMI (i.e. 1.0, 1.1, 1.2, 1.3 and so on), not all are compatible with one another. This is presently a fluid field of new innovation and changes. How will Freeview deal with determining which version is suitable for our New Zealand purpose and likely to not create future compatibility problems for consumers?

SJB: Freeview has chosen version 1.3a. There is an excellent explanation of HDMI and HDCP at: http://www.wikipedia.org/High-Definition_Multimedia_Interface HDMI has been around since 2002 and has become a standard for the purpose of moving uncompressed HD content between devices.

SF: Would it be correct to assume a study has been made of already existing HDMI compatible TV sets presently on sale in New Zealand to discover how their in-built HDMI sockets are wired and whether they might be socket and software compatible with version 1.3.a?

SJB: "There will always be exceptions but this is not something we are too concerned about."

SF: Further to the compatibility of HDMI with Freeview's plans - there is the issue of Line 21 closed captioning. Technically, it would be possible for Freeview to configure Line 21 in what HDMI terms 'the native mode' allowing approved decoders to process that line as captioning would require STBs of a special design to recognise the added data line. And it becomes more complicated because even if the STB will process Line 21, the television set must have custom ('native') logic circuits to decode the data and then display it as closed captions. This suggests to me that closed captioning will either not happen with Freeview terrestrial, or if it

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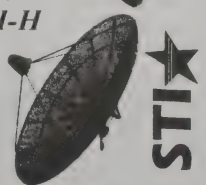

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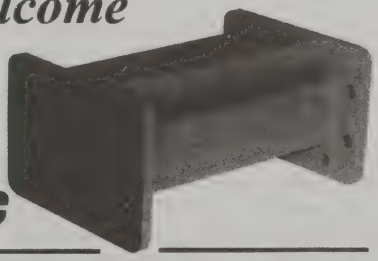

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Auckland	Waiatarua	29H	33H	45H
	Pinehill	28H	32H	40H
	Remuera	28V	32V	40V
	Sky Tower	28V	32V	40V
	Auckland infill	28V	32V	40V
Waikato	Te Aroha	46H	48H	50H
	Hamilton infill	49V	51V	47V
Tauranga	Kopukairua	49V	51V	42V
Hawkes Bay	Mt Erin	27V	31V	43V
	Napier infill	48V	50V	59V
Manawatu	Wharite	48V	50V	59V
Wellington	Kaukau	48H	50H	59H
	Fitzherbert	51V	53V	57V
	Baxters Knob	51H	53H	57H
	Wellington infill	51V	53V	57V
	Ngarara	45V	53V	57V
Christchurch	Sugarloaf	47H	49H	50H
Dunedin	Mt Cargill	43H	45H	53H

happens, will require special version receivers with software to Turn Line 21 into on-screen captions. Your comment?

SJB: "What you have described is also my understanding in relation to HDMI and analogue teletext via (the) VBI. This question is one for TVNZ rather than Freeview as it relates to the way a specific service is to be broadcast."

SF: The UK claims that between the four delivery systems (satellite, terrestrial, cable and broadband) 79% of all British homes already have access to digital. Overlooking that 'having access to' and actually 'using digital' are two widely different things, the Brits have a 'Help Scheme' which they say will be available to approximately 1 million (UK) homes. Those age 75-plus, on disability, blind or partially sighted will qualify along with those on income support. Each will receive approximately NZ$120 which in a country where a terrestrial Freeview box costs NZ$60 will purchase two STBs. Recognising Freeview is not in a position to provide such direct assistance, would you be in favour of asking government to do so?

SJB: "As previously noted, 'Digital NZ' is a body to be established and address this sort of decision. Freeview is a commercial venture by a group of broadcasters and competes with other digital platforms. On the 'have access' versus 'using digital' point, there is a significant body of research that shows people adapt well and very few 'go back to' analogue. At Freeview we are working hard to help manufacturers and importers provide products that are easy to install and use. In fact 'usability' is one set of tests in our certification process. This should help reduce the number of people who find the new technology difficult to use."

SF: The United States approach is that coupons with a NZ dollar value of around $60 each will be available there - two coupons maximum per home - to help defray the cost of the transition. Unlike the British plan, any home not presently connected to cable TV or satellite qualifies for the coupons. Our situation is widely different from either the UK or USA: the USA begins with 85 percent home penetration by either cable (65%) or satellite (20%). The UK differs because of a much more elaborate network of terrestrial stations covering small pockets of people - plus, like our Freeview via satellite, a new Freesat service will launch shortly. How do we shape our unique situation with SKY NZ as a clear market leader to fit our needs?

SJB: I am not sure how a Government option to subsidise the digital conversion for some citizens and providers, and, (the extent of) pay-TV correlate. As you suggest, each market is different and you cannot simply copy what someone else has done and assume that will work. Freeview NZ is a uniquely NZ proposition and one that many other countries have (and are) looking at as a sensible model. I've had some excellent discussions with industry leaders in a number of South East Asia countries, Ireland and South Africa; all agree that a mix of terrestrial and satellite is an efficient and cost effective way to deliver FTA digital television to the full population of both big and small countries."

SF: New Zealand will use a 720p HD format. Australia and the USA have adopted a 1080 line format. Caught in the middle will be those people who purchase a HDMI version wide screen television trying to make add-on decisions for HD version DVD players and compatible DVD discs. I was in a North Shore consumer electronics shop recently with a huge out front sign proclaiming, 'We have 1080i - the REAL thing!'. How can we expect the typical consumer to ever sort out all of these conflicting numbers and claims?

SJB: Freeview terrestrial receivers will be specified to decode SD and HD broadcasts (including both 720p and 1080i). Each broadcaster will decide which resolution to use (there is no one chosen standard and there is no need to do so). As previously discussed, there are a number of mediums that will deliver HD content (from 720p to 1080p). Retailers are now marketing full HD (1080p) displays. This is simply the latest and best available and understandably that is what gets promoted most. Freeview is and will continue to help consumers understand what they need to have (as a minimum) to enjoy the Freeview service. The important combination is minimum 1280 * 720 resolution and at least one HDMI connection with HDCP."

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Units of Measurements	dBm, dBmV, dBuV selectable by user
MPEG-2 Decoder	Yes, Embedded
Data-Logger	Yes, Also Captures MPEG picture to USB stick
Constellation Diagram	Yes, for QAM
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"...*with HDCP*."

Freeview DTT receivers (not STBs) will be specified to include HDMI ..."*with HDCP*." We discuss HDCP here (pages 9, 16). On a 'follow-up' query we asked Steve Browning to defend their position that HDCP is a *mandatory* software function for the new (Freeview) HD receivers to appear in the marketplace.

SF: HDCP is a content management package which, when a program has been so designated, allows the user to transfer or copy in its original HD format, or alternately allows transfer/copy only in SD (a direct attempt to reduce the ability to share it in pristine HD quality). HDCP is a 'negative' for consumers because it potentially removes any programming which the source deems to be undesirable for HD recording (or any recording). How can we, in good conscience, urge people to purchase a television receiver which because of HDCP may prevent them from making a copy?"

SJB: "Content protection is always a difficult issue. At one end you have consumer freedom to use, copy and share, while at the other end you have the rights of the owner (producer) of that content to protect it. For a significant portion of their schedules, NZ broadcasters are *not* the rights owner, therefore they *must do* what the rights owner requires them to do. The major international programme suppliers require HDCP or similar on high definition digital outputs for Free-to-air broadcasts.

"My understanding of HDCP is that it is an output protection system for HDMI intended for use as a connection to an HD display. The HDMI output is a full bandwidth HD component video and digital audio. The data rate is either 5 or 10 Gbits to provide the best possible quality (to the display screen). HDCP adds **scrambling** to this interconnected signal which can only be unscrambled by a compliant display (system). It is unlikely that a consumer recorder will be able to handle such a high data rate and store that amount of data on a hard drive. Also, as I understand it, HDCP can only be switched on/off - there are no copy control signals. And it is unlikely that HDMI/HDCP would be licensed for use in a recorder.

"So when we talk about televisions needing HDMI/HDCP we are talking about displaying an HD picture, not about recording. On the issue of which televisions do or don't have HDMI/HDCP, our (Freeview) research says that most of the market do. We can partly thank SKY for this as they went public over a year ago to let people know that when they go HD (at SKY), HDCP will be a requirement."

Editor's comment: It is the Betamax case dressed in new clothing, except this time around Sony is arguing against - not for - the right to record (see Coop's Comment; page 1) because today's Sony owns motion picture studios (and content rights) whereas in 1975 they did not..

SF: I think I may be hearing, 'It is too early to start educating the public about their options.' If this is the creed at this time, I must respectfully disagree when I walk into Harvey Norman on North Shore and am overwhelmed by more than 100 wide screen TV sets belting out various forms of displays. And there is not one 4:3 old standard screen on offer. Is it really too early for Freeview's partners, including TVNZ and Can west, to be creating an educational series of programs titled something like 'FUTURE TV: It is already here!'? In another year, it is projected 10 percent of all homes will have a wide screen TV and most of these people believe they are now equipped for the soon-to-arrive HD experience when in fact the device may be incapable of doing anything more than stretching a 4:3 image to 16:9.

SJB: "I don't believe there is a right or wrong device 'by area'. We agree it is not too early to provide educational support. This is something Freeview is very focused on. Our website and contact centre is designed to help people make informed (buying) decisions. There are also numerous publications, SatFACTS included, which are excellent sources of information for people. Freeview will also shortly provide point-of-sale brochures to all accredited retailers that cover the technical requirements (and choices) we are discussing here. We have already provided sales staff with a pocket guide so they can correctly pass on to consumers the facts about what Freeview offers."

SF: You ended our October (issue) interview with the point that if you could snap your fingers and make a change in Freeview's offering, you would add 2 to 4 additional TV channels and some radio. About radio; what is the barrier to having one or more national or near national commercial radio services added to Freeview?

SJB: "Each broadcaster has to pay for its transmission costs so each must assess its own business case. In time I hope we will have some commercial radio stations available."

SF: We all anticipate the launch of TVNZ7 coincidental to the terrestrial Freeview service becoming functional. What are the odds that terrestrial-only will during 2008 offer one or more channels which will not be available on satellite? And is this likely to be on a geographic region by region basis?

SJB: "TVNZ7 will be on satellite and terrestrial. It is up to each broadcaster which platform (satellite and/or terrestrial) they wish to broadcast on. Freeview does not dictate this. We hope that the majority of the channels will be on both platforms as both are important to overall take-up. Broadcasters can also choose to only broadcast in one (terrestrial geographic) region if they wish."

SF: Freeview terrestrial, being at UHF, will be a reception challenge to any home that is shadowed by local terrain, or tall buildings in CBD areas. Kordia has placed an order for 51 additional UHF digital transmitters which I take to be in part for booster or translator stations. The UK has found that in obstructed terrain it may be necessary to illuminate a shadowed region from two, three or even four directions simultaneously. Wellington's extremely irregular terrain pops to mind. Can we see a complete list of Kordia transmitter sites?

SJB: "Notice that Wellington has five transmission sites and yes, separate feeding will be done (note 'Hawkes Bay - Napier infill') as the transmission site plan with channels here indicates (table appears page 18)."

SF: Of course Freeview satellite is your 'Plan B' for individual homes that simply cannot obtain a clean terrestrial signal. But that brings us back to the public relations aspect of dealing with a consumer who has in good faith purchased the

required HDMI/HDCP receiver and once having it home and connected discovers there is no location on their roof or property where clean (DTT) reception is possible. And it quickly becomes a more complex PR problem when nearby neighbours don't have this problem - their reception of DTT works as advertised. At this point the consumer learns 'Plan B - satellite' is their only option, from which HDMI/HD is not available. Is there a recognition that some people who have read your pamphlets and chosen a HD receiver will be both disappointed and perhaps angry after having purchased the recommended equipment?

SJB: "This is a valid scenario and one that cannot be predicted with 100% accuracy. Kordia have provided Freeview coverage maps (http://freeviewnz.tv/index.php?section_id=8) which are available on our website and in retail stores. We are confident that retailers will refund people who have been unable to gain reception (as they are doing now if someone takes a satellite receiver home and cannot get it to work). In most instances it will be worth the householder getting a qualified technician to come and assess whether they can pick up a signal on the property if they are within coverage as many variables come into play and a qualified technician will be able to find a solution (or verify the lack of signal).

SF: Finally, can you bring us up to date on when you expect to announce Freeview terrestrial STBs on the approved list and how many versions do you believe there will be, by April 2008?

SJB: "We are still a few months away from knowing this. A number of companies are working on this project with us and we hope most of them will have products to offer at or soon after launch."

Recapping: The "Advantages" of Digital DTT

 # 1/ It is higher quality reception because the baseband signal to noise ratio is improved over analogue.

#2/ It operates at UHF where unwanted signal interference is less common than at VHF.

#3/ Optionally, you have a choice between normal screen (4:3) or widescreen (16:9)

#4/ Optionally, you may select an electronic programme guide.

#5/ Optionally, you may select HD (high definition) 720 or 1080 line resolution images provided you have a TV receiver offering these features.

#6/ Optionally, you may continue to use your present analogue 4:3 receiver provided you install a DTT to analogue STB between the (UHF) reception antenna and the analogue receiver

#7/ Optionally, you may continue to use your VHS or analogue channel input DVD recorder, hard drive recorder provided you install a DTT to analogue STB between the UHF antenna and the recording device (note: One STB will function for both the existing recorder and analogue receiver but limit simultaneous watching and recording to a single channel).

#8/ Optionally, if you select a 'HD Recorder' (tape, DVD or hard drive) you may record programmes in HD but only when the programme rights owners have *not* instructed the broadcaster (HDCP) to limit your recording to SD, or, at their option your recorder may not record anything at all.

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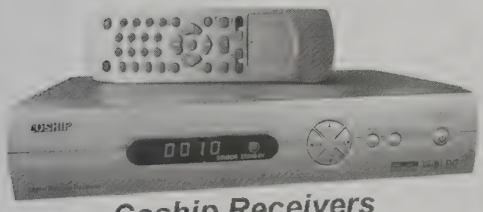

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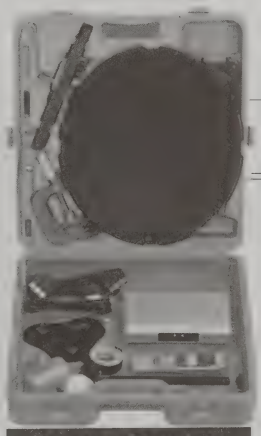

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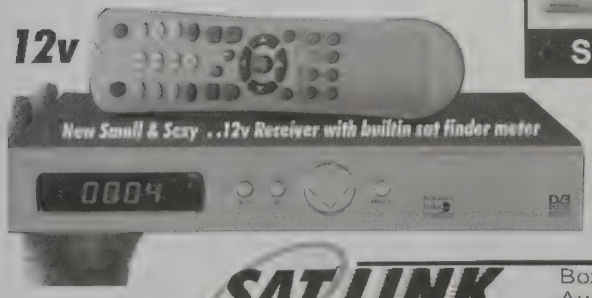

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Bird	Service	RF/IF &Polarity	# Program Channels	FEC	Msym	Receivers and Errata
Thcm5/78.5	SkyChAust	3695/1455H	up to 3	3/4	5(.000)	CA (#1, 3), FTA audio #2
	ANT Greece	3672/1478H	1 TV	3/4	13(.333)	Late July 04 room for more (FTA)
	TARBS ME mux	3640/1510H	12TV, 12 radio	2/3	28(.066)	CA + 23FTA(A1TV, IRB3, Visjon Norge,Pakistan)
	Ch Nepal	3626/1524V	1	3/4	15(.556)	New 03/03, FTA
	Mahar mux	3600/1550H	11TV, 1 rad	3/4	26(.667)	Thai + Indian services, FTA inc. Vibe TV, Sindh TV
	RR Sat mux	3551/1600H	8TV,10 radio	3/4	13(.333)	3TV, 5radio inc. Hellas TV Greece FTA
	TVK Cambodia	3448/1702H	1TV	1/2	6(.312)	**FTA**
	TARBS/Th5	3480/1670H	12 TV+radio	2/3	26(.667)	**3FTA** TV5, VTV4, ATN Bangla
	Thai Global	3425/1725V	up to 7?	2/3	27(.500)	FTA (reaches SE Australia)
InSat 2E/83	**ETV mux**	4005/1145V	6+ TV	3/4	27(.000)	Several ETV now here, wide beam
	Hyd Dig 2E	3910/1240V	1	3/4	5(.000)	SCPC, OK E Aust wide beam
	Kairali TV	3699/1451V	1	3/4	3(.184)	SCPC, OK E Aust wide beam
	Indian mux	3643/1507V	3	3/4	19(.531)	corrections 12/02
	Sky Bangla	3430/1720V	1TV	3/4	6(.000)	New - November 2002
NSS6/95E	Ant Pac (Greek)	11 104H-Australia	1 TV	3/4	2(.800)	Now CA, was 11 083H
As2/100.5E	**Guangdong TV**	4075/1075H	1TV + radio	3/4	6(.000)	July 04 FTA
	Euro Bouqt	4000/1150H	5TV, 19 radio	3/4	28(.125)	FTA TV + radio, LUXE TV HD here
	SatLink	3960/1190H	3TV	3/4	27(.500)	(Real Madrid left July 2007)
	Reuters News	3905/1245H	1TV	3/4	4(.000)	Was 3923H, sometimes **FTA**
	WorldNet	3880/1270H	4+/18radio	1/2	20(.400)	FTA; multiple audio services V2360, A2320
	APTN Asia	3799/1351H	1	3/4	5(.632)	Sometimes **FTA**, also 3895Vt
	Reuters/Sing	3775/1375H	1	3/4	5(.631)	**FTA** & CA
	Macau MUX	4148/1002V	5TV	3/4	11(.850)	5 chs TV, FTA, some tests
	Dubai MUX	4020/1430V	4+, radio	3/4	27(.500)	FTA ; Dubai Sports Ch some English, soccer
	Russian/Israel	3832/1318V	up to 4 video	3/4	7(.271)	Two Israel, two Russian (REN-TV)
	ArabSat#2	3820/1330V	8+ video?	3/4	27.5	New 07-06, 10 FTA here
	Trace TV	3792/1358V	1	3/4	2(.400)	new here Dec 2004; Euro-French music videos
	BYU-TV	3767/1383V	1 + 20 audio	1/2	6(.530)	Increased coverage, great variety audio chs(03-05)
	3-ch miniMUX	3752/1398V	up to 3	3/4	5(.640)	Sun-TV, Surya TV, KTV (FTA)
	Saudi TV1	3660/1490V	7+/tests	3/4	27(.500)	FTA MCPC, Yemen, MBC EUROsport tests
Express2/103E	**Various-tests**	3675/1475R	2	3/4	4(.340)	Now loaded from 96.5E, svrl below 3900 all RHC
As3S/105E	**Chinese regionals**	3671/1471V	2	3/4	8(.932)	New 07-06, Yanbian, Jilin Satellite TV
	CETV digital	3680/1470H	1+ TV	3/4	26(.670)	replaces analogue same freq, V33, A32
	Zee bouquet	3700/1450V	10TV	3/4	27(.500)	Now SECA 2 CA (10-04), Radio Aust. Eng. A2011
	Ch News Asia	3706/1444H	1TV (+)	3/4	6(.000)	English + V1160, A1120, 525, 625 versions
	Azio TV	3716/1434H	1TV (+)	3/4	7(.000)	Was parallel to 3640Hz analogue (now gone)
	TVB 8	3729/1421H	1TV	3/4	13(.650)	
	Zee Movies	3732/1418V	3TV	3/4	6(.500)	Conax CA, all Hindi films
	TV One	3739/1411V	1TV	3/4	2(.8934	Also reported 3 333, ¾ October 2005
	SAB TV	3743/2407V	1TV	3/4	3(.300)	SAB may no longer here here, moved to NSS-6?
	Fashion TV	3747/1403V	1TV	3/4	2(.625)	new frequency October 2005
	AAJ-TV	3750/1400V	1TV	3/4	2(.820)	New April 2005, English, urdu
	Arirang TV	3755/1395V	1	7/8	4(.418)	FTA SCPC, New PIDs V3601, A3606 June 2003
	Now TV +	3760/1390H	up to 10TV	7/8	26(.000)	CA + 10 **FTA**, DW, TV5, Al Jazeera English
	Star TV	3780/1370V	7(+)TV	3/4	28(.100)	NDS CA (Pace DVS211, Zenith)
	Pakistan	3786/1364H	2TV	3/4	5(.700)	Was 3647V, TV One & Waseb TV
	GXTV	3806/1344V	1TV + 3 radio	3/4	4(.420)	Guangxi TV, was As2
	Shaanxi TV	3813/1337V	1TV + 2 radio	3/4	4(.420)	Was As2
	Anhui TV	3820/1330V	1TV + 2 radio	3/4	4(.420)	Was As2
	Jiangsu TV	3827/1330V	1TV + 2 radio	3/4	4(.420)	Was As2
	HLJTV	3834/1316V	1TV	3/4	4(.420)	Was As2; HeiLong
	Star TV	3840/1310H	7(+) TV	7/8	26(.850)	NDS CA (Pace DVS211, Zenith)
	Star TV	3860/1290V	5(+)TV	3/4	27(500)	NDS CA (Pace DVS211, Zenith)
	Dragon TV	3886/1264V	1 TV	3/4	4(.800)	Shanghai
	Shaandong	3895/1255V	1TV + 6 radio	3/4	6(.813)	Apparently Mongolia
	CCTV1	3904/1246V	1TV, 1 radio	7/8	4(.420)	
	Jilin TV	3914/1236V	1TV + 2 radio	3/4	4(.420)	
	Star TV	3920/1230H	4+ TV	7/8	26(.850)	
	CNNI	3960/1190H	8TV, 1 radio	3/4	27(500)	PowVu CA, new SR Apr 29, CNN radio **FTA**
	StarTV	3980/1170V	6+TV	3/4	28(.100)	NDS CA, Star News India **FTA** VPID 514, APID 648
	Star TV	4000/1150H	8(+)TV	7/8	26(.850)	NDS CA w/ **4(Chinese) FTA**
	Sahara digital	4020/1130V	8TV, 1 radio	3/4	27(.250)	New Sr September 2004
	Hubei TV	4035/1115H	1TV + 2 radio	3/4	4(.420)	Was As2
	Tianjin TV	4046/1104V	1TV + 2 radio	3/4	5(.950)	new December 2004
	Sichuan TV	4051/1099H	1TV + 1 radio	3/4	4(.420)	Was As2
	Qinghai TV	4067/1083H	1TV + 2 radio	3/4	4(.420)	Was As2
	Hunan TV	4082/1068H	1TV + 1 radio	3/4	4(.420)	Was As2
	Fashion/HK-Asia	4088/1062H	1TV	3/4	2(.626)	New July 2005
	Pakistani TV	4091/1059V	4TV, 1 radio	3/4	9(.330)	new Sr, channels, April 2006
	Sun TV	4095/1055H	1	3/4	5(.554)	"History Channel" - SCPC, some English
	PTV National	4106//1044V	1TV, 1 radio	3/4	3(.333)	
	TVB8 Mux	4111/1040H	4 TV	3/4	13(.650)	MATV Ch Movies now Irdeto 1
	Indus News	4115/1035V	1	3/4	3(.331)	Hindi (+ "Plus"), day parts
	CCTV bqt	4129/1021H	4 TV, 4 radio	3/4	13(.240)	moved from 4115
	Zee Bqt #2	4140/1010V	8(+) TV	3/4	27(.500)	Now SECA 2 CA (10-04), 1 occ FTA (varies)
	Henan TV	4166/984V	1TV + 8 radio	3/4	4(.420)	Was As2
	Fujian TV	4180/970V	1TV + 2 radio	3/4	4(.420)	Was As2
	Jiangxi TV	4187/963V	1TV + 2 radio	3/4	4(.420)	Was As2
	Liaoning TV	4194/956V	1TV + 2 radio	3/4	4(.420)	Was As2
Cak1/107.5	Indovision (S-band)	2.535, 2.565, 2.595, 2.625, 2.655	33(+) TV	7/8	20(.000)	NDS CA using RCA/Thomson, **Pace IRDs, 2.535 has 2 FTA.** Bird now inclined.
T'Kom/108E	**IndoBqt**	3460/1690H	up to 6	3/4	28(.000)	also 3586H/17.500, 3496H/19.615
C2M/113E	**TPI**	4185/965V	1	3/4	6(.700)	FTA SCPA, NT/NC only
	Anteve	4144/1006V	1	3/4	6(.510)	change from 4055V, FTA SCPC
	Kabelvision Mux	4080/1070H	7+ TV	7/8	28(.125)	also try 3500H, 27.000, 3/4, strong NZ
	Indostar	4074/1076V	1	3/4	6(.500)	New (but probably temporary) 07-06
	SCTV	3934/1216H	1	3/4	6(.620)	**FTA,** may not be active full time
	Indo MUX	3880/1270H	3+ TV	7/8	28(.121)	**FTA;** Sr change 01/03, erratic
	KBS World	3838/1312V	1TV		2(.100)	New August 2007, note low res rate
	TVRI	3765/1385H	1TV	3/4	5(.555)	bounces btwn FTA and CA, unreliable (12-04)

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Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
	SCTV	3726/1424V	1TV	3/4	6(620)
	RCTI	3473/1677H	2	3/4	8(000)
C6B/115	**See**	SF#156	p. 29	for interim	update
As4/122E	**CCTV MCPC**	3820/1330V	8	3/4	27(500)
Sin3/125	**Tests**	3989/1161H	1	3/4	9(073)
Jc3/128	Miracle Net	3996/1154V	3 up to 6	5/6	22(000)
	Asian bqt	3960/1190V	up to 8	7/8	30(000)
Ap6134E	Multiple	4140/1010V	up to 8	7/8	27(500)
T18/138	**Tests**	3460/1690V	8	3/4	30(000)
Am3/140	**STS +**	3731/1419R	1	3/4	3(200)
Jc2A 154	**BYU-TV**	3915/1245V	1+ 20 languages	3/4	4(166) (?)
MeasSs2	**Astro Mux**	11 602H	up to 17TV	3/4	41(500)
B3/152	**7 Cent. Feed**	12.310H	1TV	3/4	5(100)
	AuroraBiz	12.407V	4 TV, 10 radio	2/3	30(000)
	UBI	12.425V	up to 13 TV + radio	3/4	22(500)
	Globecast 2	12.525V	13 TV, 8 radio	2/3	30(000)
	Globecast (feeds)	12.550- 555V	1TV	¾ & 2/3	6(110/ 670)
	Globecast	12.564V/T13	2+ TV	2/3	30(000)
	UBI	12.613H/T14L	11+TV	3/4	22(500)
	UBI	12.640H/T14U	11+TV	3/4	22(500)
	Globecast 1	12.658V/T7	14TV, 15 radio	2/3	30(000)
	UBI	12.674H/T15L	11+TV	3/4	22(500)
	UBI	12.701H/T15U	11+TV	3/4	22(500)
	WA ABC	12.702V	1 TV, 1 radio	7/8	14(288)
	WA SBS	12.720V	4TV, 2 radio	5/6	12(600)
	WA GWN/WIN	12.738V	2TV	7/8	14(295)
C1/156E	Aurora	12.324V/T1U			
	Pay TV	12.365V/T2	11TV, 2 radio	3/4	27(800)
	Aurora Home	12.407V/T3	5 TV, 13 radio	2/3	30(000)
	Pay-TV	12.447V/T4	5TV, 4 data	3/4	27(800)
	Pay TV	12.487V/T5	3+ TV, data	3/4	27(800)
	Aurora 2	12.527V/T6	7TV, 20 radio	3/4	30(000)
	Pay-TV	12.567V/T7	10 TV	3/4	27(800)
	Pay-TV	12.607V/T8	10 TV	3/4	27(800)
	Pay-TV	12.647V/T9	10 TV	3/4	27(800)
	Pay-TV	12.692V/T10L	6TV, 27 radio	1/2	28(650)
	Aurora MUX	12.728V/T10U	4TV, 17 radio	1/2	24(450)
	Austar	12.305H/T11	6TV, 24 data	3/4	30(000)
	Pay-TV	12.358H/T12	10 TV	3/4	27(800)
	Pay-TV	12.398H/T13	10 TV	3/4	27(800)
	Pay-TV	12.438H/T14	6TV, 3 data	3/4	27(800)
	Pay-TV	12.478H/T15	10 TV	3/4	27(800)
	Pay-TV	12.518H/T16	10 TV	3/4	27(800)
	Pay-TV	12.558H/T17	10 TV	3/4	27(800)
	Pay TV	12.598H/T18	10 TV	3/4	27(800)
	Pay-TV	12.638H/T19	10TV, 30 radio	3/4	27(800)
	Pay TV	12.688H/T20	11TV	3/4	27(800)
D1/160E	Sky NZ test	12.394V	TV +	3/4	22(500)
	SBS SE	12.451H	TV+	5/6	12(600)
	Sky NZ test	12.519V	TV+	3/4	22(500)
	Sky NZ	12.581H	TV+	3/4	22(500)
	ABC NSW	12.514H	TV	7/8	14(294)
	ABC South	12.532H	TV	7/8	14(294)
	ABC Northern	12.550H	TV	7/8	14(294)
	ABC Western	12.577H	TV	7/8	14(294)
	ABC Victoria	12.595H	TV	7/8	14(294)
	ABC Qld	12.613H	TV	7/8	14(294)
	Feeds	12.670V	TV	3/4	6(670)
	Southern Cross	12.637V	TV + 1 radio	3/4	5(100)
I8/166E	SelecTV	12.526H	8+TV	3/4	28(800)
	CCTV	12.557H	3+TV	3/4	13(240)
	ABS-CBN	12.575H	4+TV, 4+ radio	2/3	13(845)
	MYSAT	12.646H	up to 8 TV	3/4	28(066)
	JEDI/TVB	12.686H	11+ TV	3/4	28(126)
	PnGlobal Aust	12.726H	6+TV	3/4	28 (066)
	ABC A-P	4180/970H	2TV, 2 radio	3/4	27(500)
	Hallmark Asia	4166/984H	1 TV	3/4	6(620)
	Disney Pac	4140/1010H	typ 6 TV	5/6	28(125)
	Hwazen TV	4130/1020H	1 TV		
	NHK Joho	4060/1090H	7TV, 1 radio	1/2	16(180)
	FOX Mux	4040/1110V	up to 5TV	7/8	26(470)
	NET +	4121/1029V	1 TV	3/4	4(774)
	ESPN USA	4020/1130H	8+TV, data	3/4	26(470)
	Discovery	3980/1170H	8 typ	3/4	27(690)
	CalBqt/Pas8	3940/1210H	up to 3+ FTA	7/8	27(690)
	CNBC HK	3900/1250H	up to 7TV	3/4	27(500)
	FilipinoMUX	3880/1270V	up to 8TV+radio	5/6	28(694)
	CCTV Mux	3829/1321H	up to 4 + 1 radio	3/4	13(240)
	TVBS-N	3836/1314V	**1FTA**, 4+ CA	3/4	17(500)
	EMTV PNG	3808/1342V	1 + 2 radio	3/4	5(632)
	CNNI	3780/1370H	3, up to 5 TV	3/4	25(000)
	Discovery Asia	3764/1386V	Up to 6 TV	3/4	19(850)
	MTV	3740/1410H	8	2/3	27(500)
I2/169E	WA Mux Pv	12.281V	3+ TV, radio	2/3	27(500)
	Ariang TV	12.401V	1TV	3/4	4(400)
	ABS-CBN	12.575H	4TV, 2 radio		13(845)
	Test mux	12.715H	6+ TV	2/3	30(000)
	TARBS feeds	4090V/1060V	9TV + radio	3/4	21(000)
	BBC SCPC	3986/1164H	1TV	1/2	5(700)
	Middle East	3836/1314V	4 typ	3/4	13(331)

Receivers and Errata

was on 4048V; New Caledonia, parts of Australia
FTA SCPC;or, 3774H, 6.520, ¾ (June 06)
Services/bird new August 1, 2007
also. 3820V, 3940V,4100Vin blindscan
Tests, coverage unknown; Hz only? 09/07
PowerVu; some FTA (Ch. 1 & 3)
CA & **FTA** NTSC: Japan, Taiwan
scan 3500-4200 V+H; analogue 3860V
also try 3660/3540VVt, Sr 30.000, 3/4; some FTA
North beam; also try 3875R, 12.475, 1/2
Strong NZ & Australia; may now be 1/2, 6.525
Aust East beam - **3 FTA** + 14 CA
D2 will replace 16 January 2008
differs from 12.407 C1; **tune ch FTA; NZ+Au**
Now Irdeto V2
NZ + Au, FTA + Mcrypt CA
occ feeds, NZ + Au; recently 12.553V
AMTV, Healing only FTA svcs now here
High performance beam; not NZ; new CA 07-06
High performance beam; not NZ; new CA 07-06
NZ + Au (Mcrypt, PowVu capable)
High performancebeam; not NZ; new CA 07-06
High performance beam; not NZ; new CA 07-06
ABC WA tests, FTA
SBS, radio tests WA FTA
Irdeto V2 CA, tests (GWN, WIN)
not currently in use
Tests; SBS-NDS CA, others FTA when here
NZ (90cm) + Australia **(Only C1 svc left on NZ)**
Australia NA only (leakage to Norfolk, New Cal)
Australia NA only (leakage); 9-Net x 3 widescreen
Arrow radio (still here), tone FTA
Pay-per-view movies; CA
Pay-per-view movies; CA
Pay-per-view movies; CA
ABC for Foxtel/Austar; previously 12.288V
changes September 2005
Austar inter, **Expo FTA**
NDS CA + Mcrypt, CA
CA, subscriptions available Australia, Norfolk
Sky News active; 'Help x 2' **FTA**
CA, subscriptions avail Au, Nrflk; **TVSN FTA**
CA, subscriptions available Australia, Norfolk
"Home"CA, subscription available Australia, Nrflk
CA, subscriptions available Australia, Norfolk
CA, subscription available Australia, Norfolk
CA, subscription available Australia, Norfolk
+ 12.421V, Au + NZ beam
+12.469H/Qld, 12.487H/South,
+12 546 NZ only
+12 608, 644, 671, 707, 734H NZ only (Aug 2007)
Australia only
Australia only
Australia only
Australia only
Australia only
Australia only
Dual beam (Australia & NZ); V8 other feeds 08/07
Australia only
& 12.286, 12.326
FTA-Australia
CA -Australia
FTA V=5340, A=790 -Australia
June 2002-Irdeto-2 CA - Australia
Some **FTA**-Australia
Dateline west; also east PAS2, 3901V
Temporary FTA (January 2007)
PowVu CA

PowVu CA & **FTA**; sub available-changes 05-06
was PAS-2, previously 3992Vt; **feeds FTA**
NET25 + FTA; new PIDS April '03, reload
PowVu CA, ch 11 DCP-CCP bootload; audio **FTA**
PowVu/CA (some audio **FTA**)
PowVu CA & **FTA (EWTN + CBS +TBN +)**
NDS CA (6 channels); one test card occ FTA
Myx FTA V1960, A1920 + radio FTA
PowVu **FTA**, replaces PAS-2 svc
CCTV cross pole; new SR 04-06
PowVu CA
PowerVu, some audio **FTA**
PowerVu; Asian MUX; new parameters Nov '03
 # 8 MTV China FTA V289, A290; rest CA
PowVu CA, WIN, ABC NT, SBS, status unknown
Test - may not stay permanently
Temp **FTA**; subs Aust 011-800-2270-0722
initially with 6 NTSC colour bars
Occ **FTA** (Chile +), BIG power reduction Nov 03
BBC World moved here January 2005
Subscriptions available; Strong Technology

Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
(PAS2/169E)	**Adventists.tv**	4040/1010H	1	2/3	5(900)
	Feeds	3868/1182H	1	2/3	6(620)
	Feeds	3939/1211H	2 (typ NTSC)	2/3	6(620)/7(498)
	Cal PowVu	3901/1249H	up to 8	3/4	30(800)
	HK bouquet	3850/1300H	up to 8	2/3	24(900)
	Korean Bqt	3771/1379H	1	3/4	6(510)
AMC23/172E	**Various-tests**	12 730H	up to 8	3/4	30(000)
1804/174E	**iPSTAR**	12 619H	1	2/3	25(220)
	Tests-NZ beam	12.646H	1	3/4	22(418)
	RFO Poly	4027/1123R	1TV	3/4	4(566)
1701/180E	TNTV	11 060&11 514V	9	3/4	30(000)
	TVRFO	11 136V, 11 174V	6+TV, 3+ radio	3/4	23(149)
	Canal+Sat	11 610H	16TV, 1 radio	3/4	30(000)
	PBS	12 648HH	16TV possible	3/4	28(066)
	TVNZ/BBC	4186/964RHC	1	3/4	5(632)
	TVNZ	4178/972RHC	1	3/4	5(632)
	AFRTS DTS	4175/975L	3 TV, 3 radio	2/3	3(680)
	TVNZ/Aptn	4170/980RHC	1	3/4	5(632)
	Fiji Sky Pacific	4095/1055LHC	6TV + future radio	3/4	16(505)
	Fiji Sky Pacific	4055/1095LHC	7TV + future radio	3/4	16(505)
	TVNZ/feeds	4052/1098RHC	1	3/4	5(632)
	TVNZ feeds	4044/1106R	1	3/4	5(632)
	NBC to 7 Oz	3960/1190R	1	7/8	6(447)
	TBN Mux	3927/1223R	4TV	2/3	11 (394)
	WorldNet	3886/1264R	1TV, 37 radio	3/4	25(000)
	foarana	3772/1378L	1	3/4	4(566)
	NASA TV	3854/1296R	1 TV	3/4	2(000)
	TVNZ	3846/1304R	1	3/4	5(632)
	USA feeds	3749/1401R	4?	?	26(400)
NSS-5/177W	Pacific IP Data	3763/1387R	none-data	3/4	27(500)
	RFO/Tempo	3920/1230R	1	3/4	2(893)
	Wallis/Futuna	3922/1228L	1		2(895)
	BYU-TV	4185/965R	1TV, 20+ audio	1/2	6(525)
	Australia Temp.	12 522V	8 SCPC	7/8 & 5/6	14 294 & 12.600
	iPSTAR Tests	12 691V	8 TV	5/6	17(600)

Receivers and Errata
New December 2003, 24/7 "Hope Chs "
FTA (occ sport); also try 3863,Sr6 100
FTA-typ NTSC-occ sport, live Shuttle
PowVu CA + **FTA**(includes BBC-W 05-05)
was 4148Vt, some **FTA**
Korean MUX, reload 12-04, new Sr
Testing on NZ/East Australia beam
Tests, late May start, also 12 646H
Testing possible data links, June 2003
SE spot beam; was 4027LHC
east spot, 10TV + r each, vertical pol.
FTA 11.136 Tahitian beam, 11.174 west beam, 12/04
1+ **FTA**, MediaGd "2"; + 10.975 weaker
Testing Fiji region pay-TV (MDS) package (Oct '04)
DMV/NTL early vers occ feeds, typ ca
DMV/NTL early vers., occ feeds, typ ca
'DTS Direct to Sailors; audio previously FTA - gone
DMV/NTL early vers occ feeds, typically ca
Nagravision CA (Feb 1, 2005) New PIDS
All now (including Fiji 1) CA, 7 Feb, 2005)
DMV/NTL early vers.,occ feeds, typ ca
SCPC, mixed CA and **FTA** feeds
CA, Leitch encoded
January 2006-now 4 channels, new Sr
New PIDs Dec 03 very strong NZ, Pacific
FTA SCPC, East Hemi Beam-Tahiti
24/7 live NASA - West Hemi bm (can be difficult!)
SCPC, mixed CA & **FTA**, feeds
16-QAM (not MPEG-2 compatible)
Data only but useful for dish alignment
Wallis & Futuna Island(s) service
Outward bound W & F
Global beam - requires sizeable dish
Aust beam: 12 522, 538,555,574,604,**621**,**639** & **657**
CA Tests - Taiwan TV: data coming?? (NZ beam)

MPEG-2 DVB Receivers: (Data here believed accurate; we assume no responsibility for correctness!)

AV-COMM R3100. FTA, excellent sensitivity (review SF May 1998); new version Sept. '99. **AV-COMM P/L**, 61-2-9939-4377.
AV-COMM Tiny Tot. FTA, 12Vdc operated, palm sized, low power consumption; review SF#120. Contact # above.
Coship 3188C. Review SF#107. Blind search FTA rcvr; works well. Phoenix Technology Group (www.phoenixsatellite.com.au) (Irdeto 2 as well as FTA versions)
Coship FTA, CA, HDD. Review SF#143, state of art functions, blind search. Phoenix (above), Satlink NZ, fax 64-9-814-9447.
Divitone: "Left-handed" review SF#115; does "code key" entry. Available http://www.satmax.ws
eMTech eM-100B (FTA), eM-200B (FTA + CIx2), eM210B (FTA + 2xCI + positioner); KanSat 61-7-5484 6246 (review SF#89)
eM-150/Homecast. FTA + embedded multi-format, review SF#144. Sciteq (61-8-9409-6677) and Kristal (61-7-4728 7704)
Fortec Star Lifetime. Two versions, both blind search, code-key programmable, one X 2 CI. Review SF#119. www.aDigitalLife.com
Homecast (em-150, eM-1150, eM-2150) series of FTA, CA, HDD sate of art STBs, review SF#144. Sciteq (www.sciteq.com.au)
Humax ICRI 5400 (Z). Embedded Irdeto + 2 CAM slots; initial units had NTSC glitch, now fixed. Widely available; new software avail 04-04, SF#76.
Humax IRCI 5410 (Z). Adaptable version capable of holding multi-CA systems (SF#98, 99). Widely available; original importer Sciteq (www.sciteq.com.au).
Hyundai-TV/COM. HSS100B/G (Pacific) FTA. Different software; 2.26/2.27 good performers, 3.11 and those with Nokia tuners also good; later 5.0 not good.
Hyundai HSS700. FTA, PowerVu, SCPC/MCPC. Review SF March 1999. Kristal Electronics, 61-7-4788-8902.
Hyundai HSS800CI. FTA, Irdeto (with CAM) + other CA systems, PowerVu, NTSC. Kristal Electronics, above; review SF#63.
INNOVIA IDS3088. Review SF#111. Blind search FTA receiver. High quality IRD; available Phoenix TechnologyGroup, and Satmax (http://www.satmax.ws).
KAON KSF-2000/KPSF-200FTA receiver dynamic channel update/Freeview channel mapping. Asoft Ltd 64-4-234-1096.
KAON KSF-620R2 Multiroom FTA receiver Dynamic Channel update/Freeview channel mapping. ASoft Ltd. 64-4-234-1096.
KAON KSC-N550H2R new 160Gb Premium Dual PVR with analogue input. Asoft Ltd 64-4-234-1096.
ID Digital CI-24 Sensor. New August 2003; new lower noise tuner, extra sensitivity; CI Interface slot Irdeto 1 & 2; review SF#109. Sciteq 61-8-9409-6677.
MediaStar D7.5. New (May 00) single chip FTA; review June 2000 SF. MediaStar Comm. Int. 61-2-9618-5777 (www.mediastar.com.au)
MediaStar D10. FTA and Irdeto embedded CA. VG receiver; see review SF#96, August 2002. Contacts immediately above.
MultiChoice (UEC) 660. Essentially same as Australian 660, not grey market contrary to reports. Sciteq tel 61-8-9306-3738
Nokia "d-box" (V1.7X). European, FTA, may only be German language, capable of Dr. Overflow software. SF#95, p. 14.
Nokia 9200/9500. When equipped with proper software, does Aurora, originally did pay-TV services provided software has been "patched" with "Sandra" or similar program. See SF#95, p. 14, SF#96 p. 15. SatWorld 61-3-9773-9270 (www.satworld.com.au)
Pace DGT400/DVR500. Originally Galaxy (Now Foxtel+Austar). Irdeto, some FTA with difficulty (Foxtel Australia 1300-360818). UECs replaced.
Pace "Worldbox" (DSR-620 in NZ). Non-DVB compliant NDS CA including Sky NZ, no FTA; similar "Zenith" version (see SF#115, p. 15).
Phoenix 111, 222, 333 models (no longer produced): Service, backup - Phoenix Technology Group 61 3 9553 3399; www.phoenixsatellite.com.au
Pioneer TS4. Mediaguard CA (no FTA), embedded Msym, FEC, only for Canal+Satellite (AntenneCal ++687-43.81.56)
PowerVu (D9223, 9225, 9234). Non-DVB compliant MPEG-2 unless loaded with software through ESPN Boot Loader (see below). Primarily sold for proprietary CA (NHK, CMT etc). For service only - call Scientific Atlanta 61-2-9452-3388. For revision model D9850, see Scientific Atlanta (below).
Prosat 2102S. FTA SCPC/MCPC, NTSC/PAL, SCART + RCA. Sciteq 61-8-9306-3738.
SatCruiser DSR-101. FTA SCPC/MCPC, PowVu, NTSC/PAL. (Skyvision Australia 61-3-9888-7491, Telsat 64-6-356-2749); no longer available.)
SatCruiser DSR-201P. FTA SCPC/MCPC, PowVu, NTSC/PAL, analogue, positioner - (Skyvision - see above); no longer available.
SATWORK ST3618. Blind search FTA receiver. Fast search, problems, especially in "memory-filing" system; review SF#111. Available DMSi at tim@dmsiusa.com
SATWORK ST3688. Blind search, 3000+ ch memory, multi-format RF modulator; improved version 3618. Review SF#113; available DMSi (above).
Scientific Atlanta D9223, D9234, D9225; Orig. PowerVu, superceded Dec 2003 by D9850. Commercial receiver, available TVO 61-2-9281-4481, John Martin
Strong Technologies SRT2620. SCPC, MCPC FTA, exc sensitivity, ease use, programming. Review SF#91 (ph. below).
Strong SRT 4600. SCPC, MCPC, PowerVu; exc graphics, ease of use, review SF#64. Strong Technologies 61-3-8795-7990.
Strong SRT 4654X, New. mid 2007, Conax + Irdeto CA; review SF#156. Receiver is state of art, above average sensitivity. Strong Technologies 61-3-8795-7990.
Strong 4800. SCPC, MCPC, embedded Irdeto+ CAM slots, does code-key with additional software, Aurora. Strong Technologies 61-3-8795-7990.
Strong 4800 II. SCPC, MCPC CAM slots x 2 for Aurora +, Zee, Canal +, code key with additional software. Strong Technologies (above); review SF#103.
Strong 4890. SCPC, MCPC, 30Gb PVR, 2 CAM slots, DiSEqC 1.0, 1.2 (review SF#84), does code key with additional software; Strong Technologies, # above.
UEC Atlas/Titan (1000). New July 2003, replacing DGT400 for Austar. No SCART, L-band loop; also available Rural Electronics 61-2-6361 3636.
UEC642. Designed for Aurora (Irdeto), approved by Optus; w/new software, C-band FTA; faulty P/S. Norsat 61-8-9451-8300.
UEC660. Upgraded UEC642, used by Sky Racing Aust., Foxtel,limited FTA. (Nationwide - 61-7-3252-2947); P/S problems.
UEC700/720. Single chip Irdeto built-in design for Foxtel, unfriendly for FTA. Power supply problems, seldom sold to consumers; propensity to fall off back of trucks.
"X" Digital. When modified with "aftermarket" Internet softwre, does Aurora and other V-1 CA without card; review SF#119. Strong Technologies (61-3-8795-7990).
Zinwell ZMX-7500. Approved NZ Freeview, through authorised dealers; review SF#150; some unresolved technical issues as of June 2007.

Accessories:

Aurora smart cards. MCRYPT (Irdeto V2) cards now available (Jan 2005), Sciteq 61-8-9409-6677.
PowerVu Software Upgrade: PAS-8, 4020/1130Hz, Sr 26.470, 3/4; pgm ch 11 and follow instructions (do not leave early!)
PowerVu (Pacific) **repair service**: Cable & Sat Svcs, Darius West, 61-2-9792-1421 (Email darius@cases.net.au)

WITH THE OBSERVERS

AT PRESS DEADLINE

Additional bandwidth coming. The migration of D2 to 152E (now underway after apparently successful testing) will create significant (some calling it 'massive') B3=D2 transponder adjustments. The Globecast switch date (see below under "D2") is set for 15/16 January.

Launches: Chinasat 9 to 134E scheduled November 11; 22 Ku on board.

AsiaSat 2/100.5.5E: "HD on satellite (outside of Australia)? Try 4000Hz, 28.125, 3/4 for LUXE.TV which is transmitting FTA both SD and HD. Check http://luxe.tv/EN/free-to-air-satellite.php." (**John V**, NSW)

Optus B3/152E: "T8 lower/12.706V, 22.500, 3/4: This MCPC is the replacement for Globecast's T13/12.563H (30.000, 2/3). An on-screen announcement relates, 'TVN Racing Channel is now available on a new frequency. Kindly retune your receiver before November 15 to avoid service disruption; contact 1300-889-745 for further assistance'. I also note UBI has finally filled all 78 of its (available) TV channels - possibly they require T13 for further expansion. The signal strength of T8 lower was initially several dB lower than the other verticals, after October 13 it was to same level as T5 and T7; perhaps they had been testing on Australia + NZ beam. Globecast has a NIT covering four MCPCs on T8 lower: 12.706V (22.500, 3/4), 12.525V (22.500, 2/3), 12.657V (30.000, 2/3) and 12.733V (22.500, 3/4). And about which - 12.525V lists UK sourced 'Deepam TV' (Indian) but the data rate is a constant 0.6 MBit/s so this is obviously not in use (CA). On 12.563H, 'Aghapy' (Coptix religious channel) is FTA (also on UBI along with ERT World FTA). (**IF**, Qld.)

Optus C1/156E: "There are now one extra channel on the pay-per-view movie group: 12.567V (27.800, 3/4) has added 'Aurora' (the strangely named community TV channel) at V4111, A4112 (the original Aurora has been removed from T19/12.638H). On T8/12.607V (27.88, 3/4) has added 'ACC' (Baptist TV) at V4111, A4112. The original 'ACC' at presstime continues on T2/12.3267V. On T9/12.647V (27.800, 3/4) Foxtel's CA version of infomercials has added at V4101, A4102. The original is now gone from T18/12.598H. Also of interest, T9 which includes the 24/7 'Adult' channels also has the 'On Demand' channel for the 'iQ' STBs. It is V4071, A4072 and ECM 0 (yes 0 is a genuine PID) and EMM 192. There have also been 7 other transponder changes as follows: 'Bio' is now on 12.398H (V1081, A1082); 'E!' now on 12.638H (V1081, A1082); 'How To ...' now on 12.598H (V1111, A1112); 'VH1' now on 12.598H (V1031, A1032); 'Nick Jr' now on 12.638H (V1101, A1102); 'Disc Science' now on 12.638H (V1091, A1092) and finally 'Boomerang' is on 12.478H (V1101, A1102). And there are new channels as follows, all labelled as 'Spr': T12/12.358H, V1101/A1106/Txt 1106 - same as 'Showtime Greats'; T15/12.478H, V1041/A1942 - same as 'Main Event'; T16/12.518H, V1061/A1062 - same as 'Classics + 2'; T19/12.638H, V1051, A1052 - same as 'Disc Health'. NEW mid-October 'Showcase' (CA) T13/12.398H, V1111, A1112, Txt 1116, AC3=1114. EPG currently reads: 'Showcase is part of your Showtime channels package - launching December 1. In the meantime please enjoy sneak previews of the premiere drama series, feature length docos, and cool indy cinema coming your way right here on channel 403.' (**AI**, Victoria)

Optus D1/160E: "Doing SDT/BAT table check find SKY NZ is now telling their STBs to pull 3 channels from Freeview: 1922 is Stratos, 1923 is Parliament and 1025 is Maori TV. And Maori TV from 12.608 on Sky is renamed 'Res' with SID of 1205." (**SB**) "Southern Cross moved from 12.637H to 12.637V, FTA, Sr 5.100." (**Jack**)

Optus D2/152E: Successfully launched October 6, testing at 177E, and scheduled to be co-located with B3 (152E) 'early in December' - Globecast says they will transfer ('migrate') transponders from B3 to D2 'early in the morning January 15' and 'there will be a frequency change for all (Globecast +) transponders'. Globecast intends to put up an announcement listing all of its transponders at 6am January 15th (on 12.707V, Sr 22.500, 3/4). They advise, '(once on 12.707V) network search must be set to enabled or on so that (the STB) can load all available channels' More data as available http://www.globecastaustralia.com. (**NG**)

Soapbox: "On the subject of terrestrial DTT and teletrext or subtitles. The Topfield TF400T does insert the teletext information in the VBI (vertical blanking interval) within the composite output and the RF modulated output. The LG LCD set can decode the teletext from these analogue signals but strangely on its internal digital tuner it will decode subtitling but will not recognise that teletext is on the channel, even after reloading the PIDs to be sure it knew the teletext was present." (**IF**, Qld) "Reference the missing rooftop cameras which Freeview was transmitting - I recall when Globecast placed an outside camera view on their ad hoc channel which had a remarkable zoom feature- you could watch storms approaching from some distance or the Sydney Harbour Bridge. I miss that as well!" (**NS**, NSW) "In case anyone wonders about the Sony Blu-Ray output, it is capable of 1080 lines in the P (progressive scan) format and most believe progressive remains the best approach - better than the i (interlaced)." (**Harry T.**) "I wonder how many readers were baffled by the image on the front cover of SF for October showing a band III antenna with what appears to be just half of a folded dipole driven element." (**IF**, Qld) (Editor's response: Blonder Tongue

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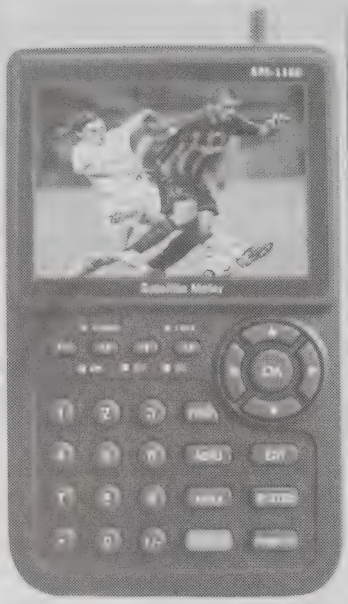
WITH THE OBSERVERS: Reports of new programmers, changes in established programming sources are encouraged from readers throughout the Pacific and Asian regions. Information shared here is an important tool in our ever expanding satellite TV universe. **Photos of yourself, your equipment** or off-air photos taken from your TV screen **are welcomed**. TV screen photos: If PAL or SECAM, set camera to f3.5-f5 at 1/15th second with ASA 100 film; for NTSC, change shutter speed to 1/30th. Use no flash, set camera on tripod or hold steady. Alternately submit any VHS speed, format reception directly to SatFACTS and we will photograph for you. Deadline for December 15th issue: December 4th by mail or 5PM NZST December 5th if by fax to 64-9-406-1083



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Since late 2004 broadband interference in the C-band satellite spectrum has been ever present in the Sydney metropolitan area wiping out an estimated 10,000 C-band viewers as well as many commercial sites. This interference caused by Unwired Australia has now spread to Melbourne. To fight this interference, Av-Comm has designed a range of products to allow customers to continue using C-band systems.

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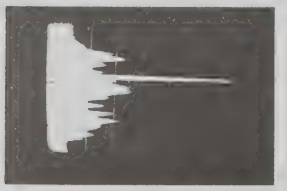
- Waveguide Filter 3.7 – 4.2Ghz



Spectrum Showing Unwired

Spectrum After Filtering

As each site that suffers interference is different, there is no one fix for all affected sites but over the past two years we have developed many combinations to give you the best chance of beating this problem. Our commercial solutions have a 100% success rate. If you are experiencing problems caused by interference feel free to call us and we will help find the best solution for you.

These firms are available to do contract dish installs

Fiji Islands

C.B. Communications, **Sigatoka** (Ph6520227; cbcom@connect.com.fj)
Safeway Electronics Ltd, **Suva + Lautoka + all islands** (Ph 3395300/6666822; safeway@connect.com.fj)
SATSHEK Communications, **Suva** (Ph3307933; parmarbros@connect.com.fj)

New Zealand:

Tauranga TV Svcs Ltd, western **Bay of Plenty** (ethnic Ku packages) (Ph 07 578 7276; dave-tts@clear.net.nz)
Raycom, **Coromandel Peninsula/Waihi/Tairua** (B1 FTA) (Ph 07 864 8083; raycom@slingshot.co.nz)
Frontline Electronics, **Mosgiel** region (ethnic Ku packages) (Ph 03 489 4001)
Advanced Aerials, **Napier/Hawkes Bay**, comcls (Ph06835 6618/021 272 6618; advanceaerials@xtra.co.nz)
Nelson TV & Video Svcs, all **Nelson Bays** (Ph 03 548 0304; ntv@tasman.net)
Rexels AV Electronics Ltd, **Palmerston N, Manawatu, Hawke's Bay, Wanganui** (Ph 06 357 6186; rxl@xtra/co.nz)
John Stewart, **southland** including Otago (john.s@tritec.co.nz)
The Antenna Man, **Taranaki** (Ph 06 758 1633; antenna.man@xtra.co.nz)
Quality Pics, entire **Waikaito** region (Ph 0800 007 667; maxnkay@xtra.co.nz)
Smartzone, **Wellington-Wairarapa-Palmerston N** (C+Ku) (Ph 029 289 6333; info@smartzonesystems.co.nz)
Homestead HiTech, **Wellington, Masteron-Levin** (PAS-2, B1, B3) fitzgera@ihug.co.nz)
Waipu Cable Television, **Wellsford to North Cape** (*Bluekiss*), (Ph 09 4320 973; waipucable@xtra.co.nz)

Australia Wide

Regional Outcomes (60+ locations, **all states, territories**) (03 9923 7333; installs@regionaloutcomes.com.au) (*)

New South Wales:

Woolgoola Antenna Service, **Coffs Harbour** (50km radius) (Ph 0266561889; woopaerials@iprimus.com.au)
Town & Country Antennas, 60km radius **Murwillumba/Tweeds Heads** (Ph 02 6672 8595)
Newcastle Satellite, **Newcastle + Lwr Hunter Vly** (Ph 0249614449; satellites@netcentral.com.au)
Home Satellite TV, 40km radius **Port Macquarie** (Ph 02 6584 3838; kazbah25@optusnet.com.au)
Goodcom Communications P/L, 100km radius of **Walcha** (Ph 02 6777 1044; goodcom@northnet.com.au)

Northern Territory

ALLSAT TV, **Darwin and NT**; (Ph 041 863 3720; allsat.tv@pacific.net.au)

Queensland:

Cape York Electronics, **Cooktown and "the cape"** (started 1970s) (Ph 07 40 695 252; cyectn@tpg.com.au)
Phil's Antenna Systems, 100km radius of **Hervey Bay** (C+Ku since 1996). (Ph 0741 256 273)
Rick Dalton TV & Satellite, 100km of **Kawana Waters** (C + Ku). (Ph 07 5493 4343; rick@antechtv.com.au)
Teleworks, 100km of **Cairns** (C + Ku). (Ph 0412 84115; rajvrm@aol.com)
Videotronics Mackay, **Mackay/Whitsundays** radius 200km. (Ph 07 495 575 052; sales@videotronics.com.au)

South Australia

Central Eyre Comms, **Arno Bay-Eyre Penins.** (Ph 08 8628 0203; centraleyrecomms@ozemail.com.au)

Tasmania:

.65 Electronics, **Launceston and Northern Tasmania** (Ph 03 63 330820; sales@65group.com)

Victoria:

Riviera Satellite Antenna Svcs, 100km radius **Bairnsdale** (Ph 03 5152 4884; gilhooleystv@net-tech.com.au)
Leden Communications, (100km radius) **Glengarry** (Ph 0427 745105; leden@netspace.net.au)
Geoff's Communications, 60km radius **Korumburra** (Ph 0408 582010; gwyhoon@tpg.com.au)
Foreign Satellite TVP/L, **Melbourne (region)** C+Ku since 1995 (Ph 040445509; joe.sat.tv@hotmail.com)(*)

Solomon Islands

Satellite Solutions, **Honiara + all Solomon Islands** (since 1994) (Ph 677 25589, satsol@solomon.com.sb)

Thailand:

JSAT tv/Jon Clarke, **ex-pat community - nationwide** (Ph +661 513 5418; info@jsat.tv)

To be listed here, tell us: 1/name of your business or your name, 2/ your home town and radius-distance covered from same, 3/ your telco, 4/ your e-mail. Send to skyking@clear.net.nz, or fax to ++64 9 406 1083 or mail to SatFACTS, PO Box 330, Mangonui, Far North, NZ. No, there is *no charge* to be listed **but** you must be a SatFACTS subscriber! (* - NEW or modified this month.)

(the antenna's manufacturer) used this technique to allow a better impedance match to the commonly used 75 ohm unbalanced lines (such as RG6, RG11). A folded dipole multi-element antenna automatically has (1) a balanced impedance, and, (2) some value other than the theoretical 288/300 ohms because the physical proximity of the reflector and the directors load down the antenna's impedance to some number in the region of 40-60 ohms. Thus by using only half of the dipole,. with appropriate electrical design, the feed element becomes UNbalanced and the impedance is easier to match to the 75 ohm transmission line. Ike Blonder, half of the firm's original name, was the creator of this antenna design.)

"Cannot wait? TVNZ ondemand has signed agreement to provide Disney-ABC and other top rated USA shows 'within 24 hours of their (USA) initial broadcast' on the web service; including 'Brothers and Sisters currently appearing months delayed on TV2. If the technology keeps improving, OTA may be shot in the foot by OTA broadcasters!" (**John H.**) Foxtel's new HD service is now scheduled to start 'early 2008' rather than January as previously announced. Users will require HD iQ STB as well as appropriate HDMI connected display system." (**Barry**) "Supreme Master TV scheduled for November 16 start (17th here) on B3, AS2 and AS3S. Programming is mixture of self-help and religion from USA; FTA." (**L.A. Mayor**)

Coop's Satellite/Terrestrial television reception reference library

Books and other unique goodies:

❑ **TELEVISION'S PIRATES:** *Hiding behind your picture tube.* This book, semi-autobiographical by Coop, traces the long and twisted path from early over the air FTA broadcasting to attempts to operate some services in a CA (conditional access) mode. And the fun-read part - the guys (and gals - identified by name and location) who "beat the system" or at the very least made life miserable for the service providers. This is the REAL story of television piracy, spanning nearly 50 years of time and hundreds of personalities. (First printed 2006) 928 pages - you won't read it the first night! US$29.95 (includes shipping inside USA - not Canada!), Au$34 plus shipping from NZ, NZ$39 (includes shipping inside New Zealand).

❑ **C-BAND Remembered**: More than 30 "stories" by the pioneers of home satellite reception. It was an era never to be repeated - American technology that reduced the cost of a (C-Band) home dish from $15,000 to under $1,000 in just two years, turning home dish reception into an international system. Coop asked 30 pioneers for their reflections on what they did, why, when and where and this unusual book tells it all. A gentle read, approximately 200 pages in writer-chapter form plus 32 pages of full colour illustrations from the 1980s era. (First printed 2007) US$20 (includes postage inside of USA), Au$23 plus shipping from New Zealand, NZ$27 (includes shipping inside of New Zealand).

❑ **SatFACTS Anthology**: Issues 1 through 156 (the first 13 years!) on CD/DVD. Nearly 5,000 pages of *SatFACTS* - from the first appearance of home satellite dishes in the Pacific through August 2007. The genuine material as it happened, right their on your PC screen (requires Acrobat Reader software to be used). US$40/Au$45/NZ$53 postage paid.

❑ **CATJ-CSD Anthology**: 1974 through 1987. Before there was SatFACTS, back in the US of A, from 1974 through 1979 Coop created CATJ (*Community Antenna Television Journal*) and from 1979 through 1987 CSD (*Coop's Satellite Digest*). This spans the full era from before satellite to the end of C-Band as America had grown to love it (from no home dish systems in 1978 to more than 3 million in 1987!). More than 10,000 pages (!!!) of as it happened - warts and all. This is the bargain of all bargains - US$30/Au$38/NZ$47 includes postage.

❑ **Coop's TV Reception Addendum**: 25+ valuable technical articles detailing subjects you will find no place else, from huge monster self-made terrestrial reception antennas to tricks you can do with your home satellite dish system that you probably thought impossible. Incudes detailed treatment for wiring motel/hotel systems with either satellite (L-Band) or VHF-UHF MATV. If it is worth researching, Coop has it here in CD format. US$25/Au$28/NZ$33 postage paid.

❑ **TVRO's Fifth Birthday Party**: The TV Show! The real people (pioneers) all gathered in one location (Nashville, Tennessee) and over two hours celebrating the origins of their industry. A professional "Awards" TV program, broadcast by HBO in 1983. US$25/Au$30/NZ$33 including postage. PAL format, plays on your PC.

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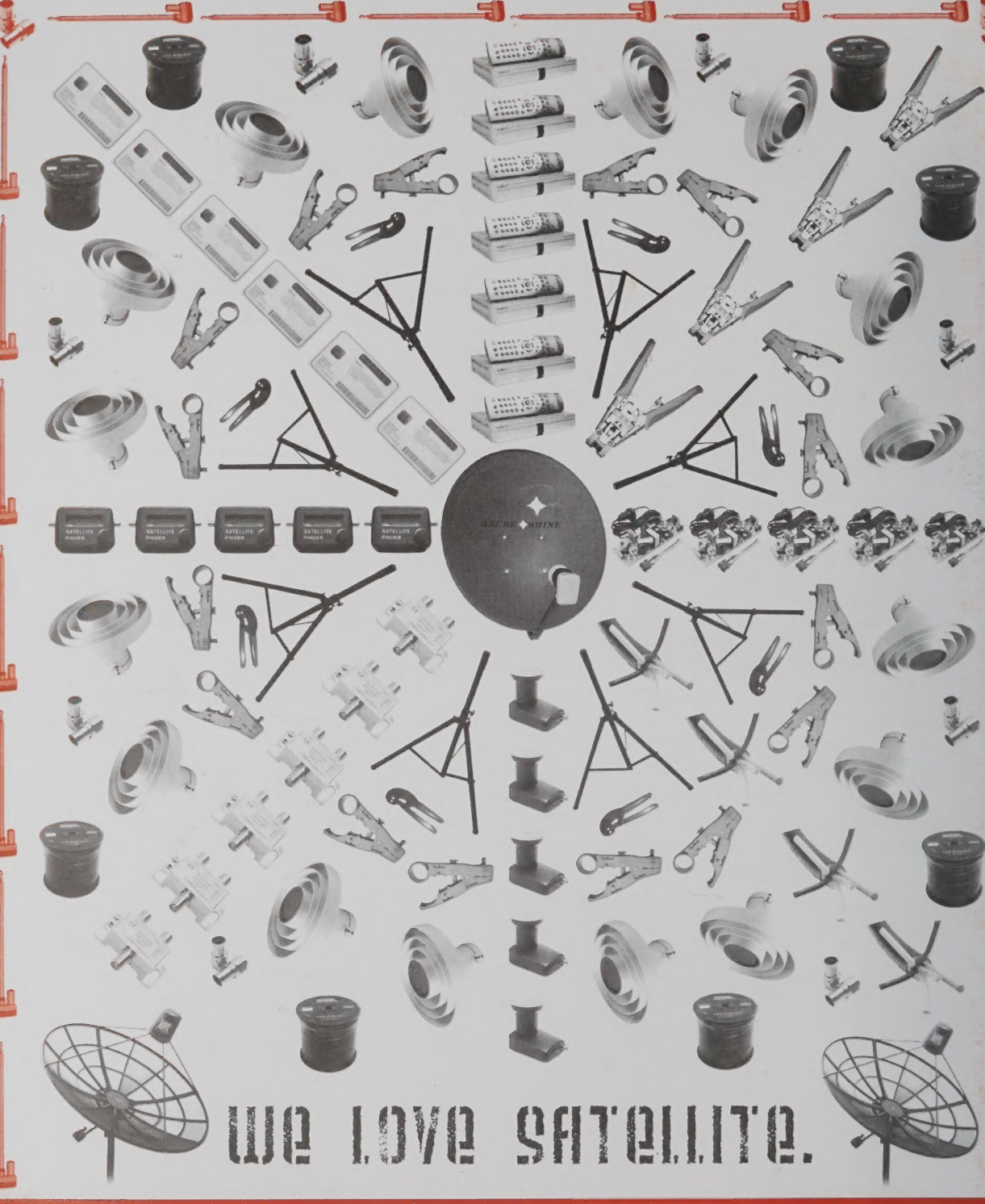

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